

# Element Comparisons to Uranium in South Carolina Well-Water

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## Background

Several years ago, a woman in Simpsonville, South Carolina was diagnosed with elevated levels of uranium in her body. DHEC studied the area and concluded that the "Uranium Lady's" well water was pulled from an aquifer that was considerably higher in uranium than background levels.

## Intended Uses and Users

By studying the data collected by DHEC and Furman University, I have attempted to determine correlations between uranium levels and other elements. This study is important so that if a relationship is established between an element, such as Al, Ba, etc., and uranium, and elevated areas of that particular element are known, then the region can then be tested for dangerous uranium content. Each of these relationships have been plotted on separate maps using the ArcView 9.0 program.

I hope this information will aid DHEC and Furman University's River Basin Research Initiative in determining health risks for citizens in the Upstate.

Sample Locations in South Carolina

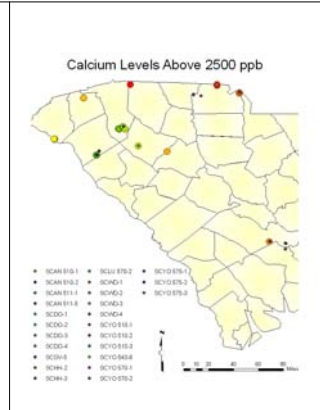
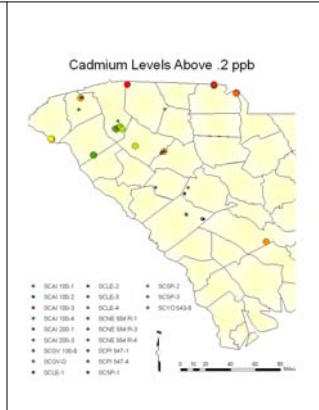
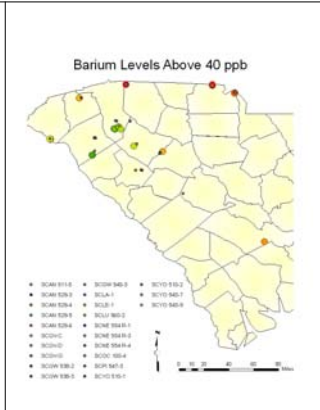
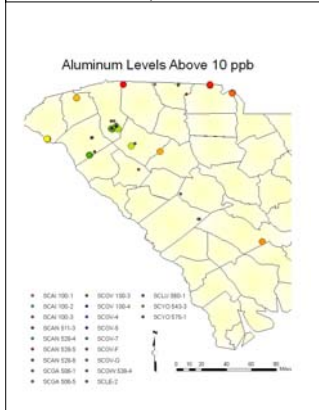
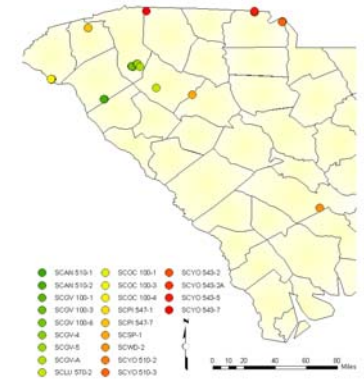


## Method

With the help of three other students, Mitchell Gober, Amy Jo Tweedell, and Laura McCary, I toured South Carolina taking well-water samples from residents. We chose locations directly following a former DHEC study of the area. After collecting 115 samples, the water was sent to a lab for analysis of all elements. Results of element concentrations that were shown in excel file did not provide any obvious correlation. I took the information and used ArcView to plot locations and elevated levels of various elements.

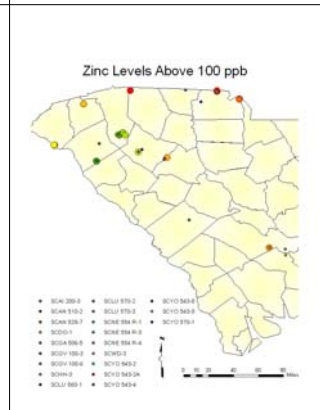
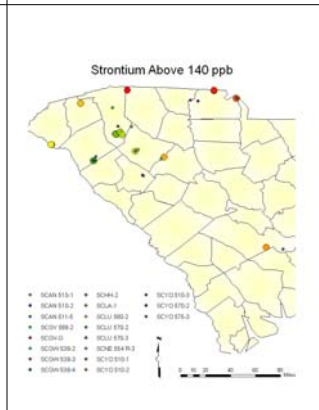
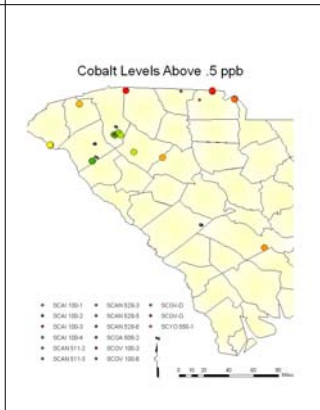
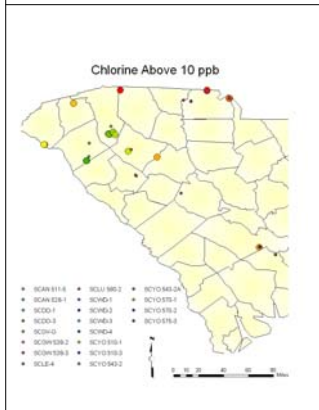
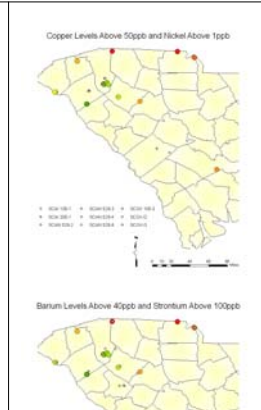
I created a layer of locations where the top 20% of uranium readings could be compared to other elements. I then determined the top 20% of other elements, typically between 16 and 25 values, and layered over the uranium file in order to determine a correlation. The eight maps present, aluminum, barium, calcium, cadmium, chlorine, cobalt, strontium and zinc, demonstrate the best correlation of all the elements. In addition to individual element layers, one layer was created using a geologic map and three others were created comparing, copper and nickel, barium and strontium and chlorine and sulfur, respectively.

Uranium Levels Above 2 ppb



## Conclusion

Individuals ingest small amounts of uranium everyday through water, air, and their food. However, increased amounts of uranium can cause kidney disease and eventually cancer. Locating potentially contaminated water is an important task for the government in order to protect its civilians. Unfortunately this study has not provided conclusive results as to what elements are elevated in conjunction with uranium. The elements Al, Ba, Cl, Sr, and Zn show a close relationship, along with along fault lines. These elevated samples had increased uranium at the sampling location or in locations near their respective locations. Much more extensive sampling must be performed in more areas around the state to hopefully establish a correlation.



## Acknowledgements

This project would not have been possible without the field work performed by my colleges, Mitchell Gober, Amy Jo Tweedell and Laura McCary. Our group was advised by Drs. Brannon Andersen, Ken Sargent, and Van Price. Particular poster and project guidance was contributed from Dr. Suresh Muthukrishnan.

