

DATA MANAGEMENT/DESCRIPTIVE STATISTICS

A fundamental mission of the Water Survey has been to “survey” the waters of the state, monitoring and collecting data. The Water Survey has been collecting data for more than 120 years, resulting in large datasets for a variety of parameters (e.g., groundwater levels, water quality, well logs, meteorological and climate data, stream discharges, water use data, etc.).

Historically these datasets have been managed, for the most part, independently. Only in recent years has there been a push to get these datasets to talk to one another. This effort goes beyond the Water Survey, most notably data collected by the Geological Survey.

Managing the large amounts of data the Water Survey has collected and continues to collect is challenging. Much progress is being made, but recent failures that occurred during migration to the new website reveal how much more needs to be done. In addition to managing the data, Water Survey staff also evaluate the data, but the full potential of mining these large datasets is not being met. Improved database management would make this easier.

PRI currently has programming staff with expertise in water science (Rogers, B. Larson) currently working on some of these activities. Ideally PRI would hire a programmer committed to administrative needs, freeing up Rogers and Larson to spend more of their time on water data management issues. It can't be overstated the importance of developing both knowledge and an understanding of water issues within our programming expertise. These staff are not interchangeable, and our scientists spend significant time training them on the science behind the data and programming they are developing.

Getting external funding for programmers can be difficult. We have managed to get state funds (IDNR, IEPA) to support some of these activities. It's unclear what federal funding might be available for this kind of work. Some of our datasets are quite large, and we may be able to tap into some “large data” funding sources, although attempts to date have not been encouraging.

Aquifer research is built on the interaction of rock layers and water moving over, around, and through them. More than a century of hydrogeological observations kept by PRI offer potentially enhanced understanding of these interrelationships of measurable value.

Aquifer risk management can only be improved by data management which correlates specific geological variables and water quality. This is especially true in the face of climate change. For instance, in one recent USGS study demonstrated that the age of the rocks and the water, dissolved minerals, and dissolved oxygen levels in Illinois and adjacent states determined the levels and mobility of radium in groundwater.

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