



## Missouri River Alluvial Aquifer

HydraSleeve

### Summary

<b>Media:</b>	Groundwater
<b>Study Type:</b>	Side-by-side and comparison study
<b>Technology:</b>	Grab
<b>Peer Reviewed:</b>	No
<b>Publication Date:</b>	2013

### Study Description

The study area for this report consisted of 11 monitoring wells within a municipal well field including monitoring and supply wells. The monitoring wells selected for the study had monitoring well-to-supply well groundwater travel times ranging from 0.5 to 10 years. The purpose of this study was to compare groundwater analytical results collected via conventional purge and pump methods (“pump method”) and grab sampling methods via HydraSleeve (“grab method”). Concentration differences between the two sample methods were quantified by evaluating the variability between environmental and historical duplicate samples using root mean square error and relative percent difference (RPD).

Historically, groundwater samples were collected at the site via the pump method. The selected monitoring wells were sampled during September and October 2013 and concentrations of selected constituents (nutrients, major ions, trace elements, and fuel compounds) were compared.

Grab samples were collected after HydraSleeves were deployed for a calculated equilibrium period of 7 days. Pump samples were collected immediately after grab samples, following a conventional purging of the well (“generally at least three well casing volumes”).

The report noted several benefits of using grab samplers, such as the HydraSleeve, versus conventional pump methods, including lighter and less equipment (conducive to sampling at remote locations), less time required for deployment and collection, and the reduction of cross contamination via engine fumes from generators used during conventional pump sampling.

The study also noted limitations of using the HydraSleeve, including sample volume limitations that may inhibit collection of quality control samples. The study stated, “Duplicate grab samples were collected by tethering two grab samplers together, because the amount of water collected by each grab sampler is close to the amount necessary for analysis.” However, screened interval lengths of monitoring wells in the well field were “not conducive to collecting multiple grab samples by tethering samplers.”

### Remedial Phase

Long-term monitoring

### Outcome

The study concluded that variability between pump and grab samples may have minimal effect on the ability to monitor temporal changes and groundwater contamination threats for the analyzed nutrients and major ions.



Certain trace element concentrations (barium, molybdenum, boron, and uranium) were generally higher in grab samples than pump samples. This was possibly attributed to the use of a larger pore size filter for grab samples. Possible zinc contamination from the syringe or filter in zinc blank samples was also reported. The study concluded that variations between pump and grab samples in trace element concentrations should be considered when determining acceptable variation amounts.

None of the fuel compounds analyzed for each sample method were found above the minimum detection limit. A determination in the comparison between sample methods could not be made.

Sample volume limitations may restrict the use of grab samplers (HydraSleeve). However, the study suggests that if the required sample volume for analysis is reduced by the laboratory, then sufficient sample volume for both environmental and quality assurance samples may be met.

### Case Study Source

Krempa, Heather M. 2015. "Concentration Comparison of Selected Constituents Between Groundwater Samples Collected Within the Missouri River Alluvial Aquifer Using Purge and Pump and Grab-sampling Methods, Near the City of Independence, Missouri, 2013." Scientific Investigations Report, January.  
<https://doi.org/10.3133/sir20155144>.