ESTCP

ER-201209 | DECEMBER 2015

Groundwater Monitoring Sampling Methods

PROBLEM

Short-term variability in contaminant concentrations makes long-term reductions hard to predict.

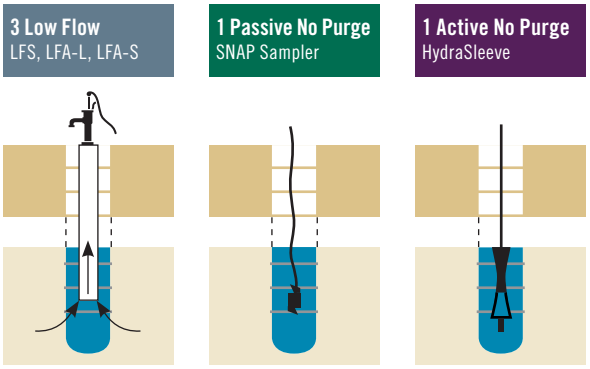
ASSESSMENT

Investigators from GSI Environmental, Inc. determined whether alternative groundwater sampling methods would reduce the short-term variability in groundwater monitoring results and influence the number of samples needed to determine long-term trends and cleanup time. They compared:

5 sampling methods at 2 month intervals over 2 years in 8 monitoring wells

Researchers also developed an excel-based tool to help practitioners determine optimal monitoring frequency and estimate the time required for cleanup.

FIVE SAMPLING METHODS



RESULTS

Different sampling methods produced similar results.

- The sampling method had only a modest impact on monitoring variability and concentration.
- Choose method based on cost and convenience.
- Monitoring purge-to-parameter stability did not improve data quality.

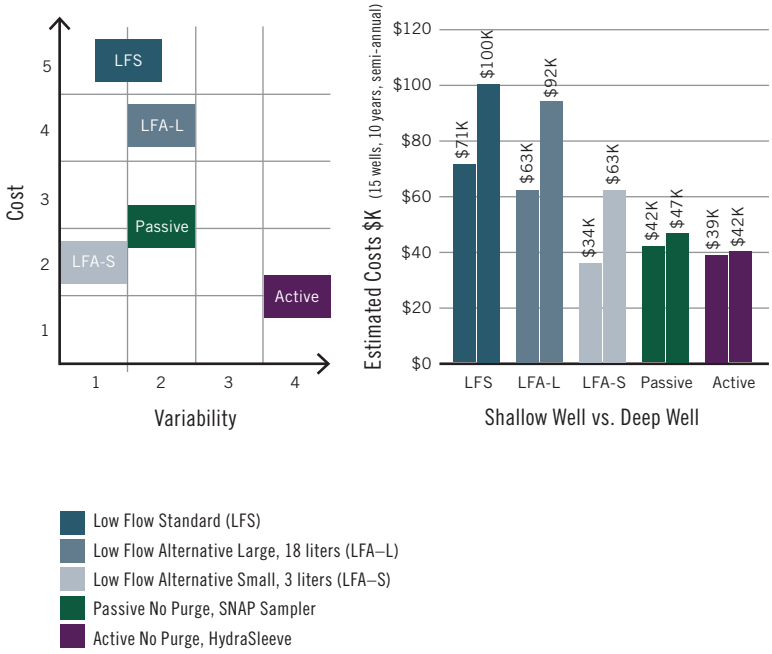
Trade-off between monitoring frequency & duration is fixed

- Researchers found a fixed relationship between monitoring frequency and duration that held true for all sites.
- Less frequent monitoring takes a longer period of time overall but is less costly.
- Too little data can be misleading. Seven years is the average time needed to determine the long-term attenuation rate.

New toolkit helps determine optimal monitoring frequency.

- Explores trade-offs between monitoring frequency and the overall time required for trend identification.
- Determines how much data is needed to draw meaningful conclusions about the direction and speed of contamination change.
- Predicts when a site will meet its groundwater clean-up goal.
- Allows project managers to focus on factors other than the data quality of sampling methods.

ANALYSIS OF METHODS AND ESTIMATED RELATIVE COSTS



MORE INFO

The full report, toolkit and user's guide are available free on the SERDP-ESTCP website

https://www.serdp-estcp.org/Program-Areas/Environmental-Restoration/Contaminated-Groundwater/Monitoring/ER-201209/ER-201209