Montana Ground-Water Assessment
Long-term water-quality records

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The Montana Ground-Water Assessment Program characterizes ground-water resources in multi-county study areas (Characterization) and monitors long-term water levels (quantity) and water quality in a state-wide monitoring network (Monitoring). Data and products are distributed through the Ground-Water Information Center (GWIC) database at http://mbmggwic.mtech.edu.

Water-quality questions that the Ground-Water Assessment program helps answer:

1. What is the quality of ground water and for what can it be used? – This question requires one-time spatially distributed samplings of aquifers.
2. How does ground-water quality change spatially?
3. How is ground-water quality changing temporally? – This question requires time-series sampling from a common set of wells.

Ground-Water Characterization:

- Characterization Program staff collect about 275 water samples from aquifers within each study area. Additionally 30-40 environmental isotope samples are collected each fiscal year to determine relative ages of ground water.
- Samples are analyzed for common ions, trace metals, and nitrate.
- The program generates water-quality data that people use to determine the quality of water in their area of interest (Question No. 2 above).
- The program generates baseline data that can be evaluated spatially to delineate problem areas (Question No. 1 above).
- The program provides baseline data that can be compared to results of future sampling (Questions Nos. 1, 2, and 3 above).

Ground-Water Monitoring:

- Each year, Monitoring Program staff collects about 70 water samples from the 900-well statewide monitoring network.
- Network wells are sampled one time every 10+/- years.
- Wells are sampled repeatedly to generate time-series data on "parameters of interest" such as nitrate, arsenic, or selenium (Question No. 2 above).

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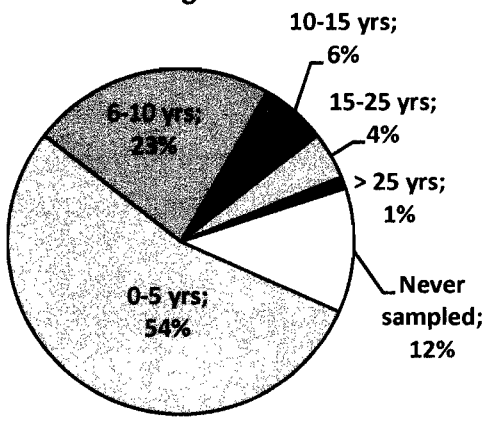
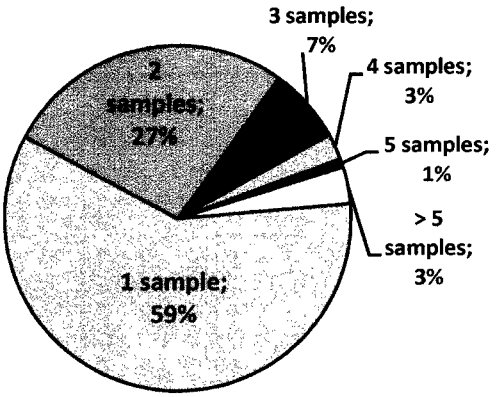
Attributes of the Ground-Water Monitoring Program

Years since last sample: Statewide monitoring network



The chart to the left shows that about slightly more than half of the 900 network wells were sampled in the last 5 years. Another quarter of the wells were sampled in the last 10 years. About 10 percent have not been sampled for periods as long as 25 years. Most of these wells are difficult to sample requiring pumps, generators, and more than one person. Twelve percent of the network wells have not, or cannot be sampled.

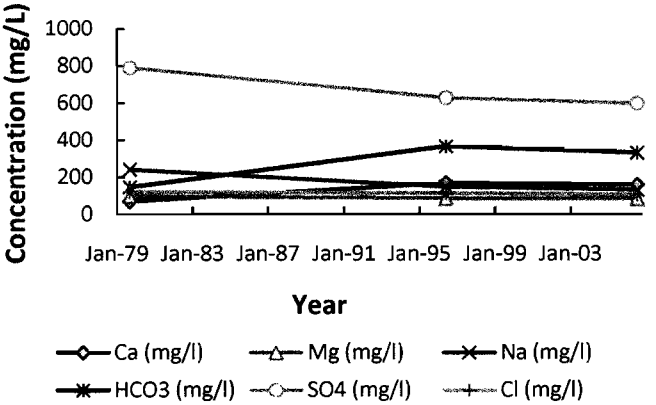
Total number of samples per well: Statewide monitoring network



The chart to the right shows the number of times monitoring network wells have been sampled. About 60 percent of the wells have at least one sample and another 27 percent have at least two samples. About 15 percent of the wells have three or more samples.

Examples of the records the monitoring program is developing are shown below.

Common ions in samples from well 2394: Madison Limestone: Depth 605 ft



Nitrate as N in samples from well 2394: Madison Limestone: Depth 605 ft