

The U.S. Geological Survey is committed to providing data of known quality to stakeholders. The role of the Office of Water Quality - Branch of Quality Systems (BQS) is to support that commitment by quality assuring laboratory and field measurements and supplying reference materials to USGS water-quality programs and projects. Quality Assurance (QA) data from BQS projects are used to estimate bias and variability within the field, analytical and measurement processes. Statistical, graphical, and data reports summarizing the QA data are produced and distributed to both USGS and external customers.

**Eight quality-assurance projects support this mission:**

- **Standard Reference Samples (SRS)**
  - The SRS Project formulates reference samples using natural-matrix water and determines known concentrations from multiple laboratories' results. Laboratories analyzing reference samples in the SRS round-robins are given performance ratings on their results compared to many other participating laboratories. The resulting library of reference waters with known concentrations includes multiple concentrations of constituent groups: trace elements, major ions, mercury, and nutrients. Samples can be purchased from BQS.
  - In a typical year, over 1500 natural-matrix reference samples with known concentrations are purchased by and shipped to over 100 cooperator, contract and USGS laboratories. The laboratories use these samples in their internal quality control procedures to improve analytical performance.
  
- **Inorganic Blind Sample Project (IBSP)**
  - The IBSP quality assures inorganic constituents at the USGS National Water Quality Laboratory (NWQL). Bias and variability data are summarized and made available online to USGS scientists that use these data to estimate laboratory bias and variability for inorganic constituents.
  
  - During water year 2012, 86 of 88 (98%) constituents analyzed by the NWQL were within the precision of the method and 73 of 88 (83%) constituents showed no significant bias.
  
- **Organic Blind Sample Project (OBSP)**
  - Over 600 organic analyses at the NWQL are quality assured and monitored for bias, variability, false positives, and false negatives by the OBSP. Summary reports are supplied to USGS-NWQL water quality personnel 3-4 times per year. All data, graphs, and summaries for current and past years are available online to USGS personnel.
  - OBSP results can be referenced by scientists to estimate the laboratory error associated with the organic analyses.

- **Laboratory Evaluation Program (LEP)**
  - Participation in the LEP ensures that laboratories used by USGS water quality projects are qualified to analyze USGS samples.
  - The LEP provides technical guidance to USGS projects for the laboratory evaluation and approval process, supplying BQS reference materials and laboratory performance data, when available.
  
- **Sediment Laboratory Quality Assurance (SLQA)**
  - The SLQA project evaluates bias and variability results for laboratories analyzing suspended sediment samples for USGS Science Centers. The project formulates and submits 2 rounds of reference material samples each year to approximately 25 participating laboratories, 12 of which are USGS laboratories.
  - SLQA reports are published semi-annually, which help both data users quantify errors and laboratories improve their analytical processes.
  
- **National Field Quality Assurance (NFQA)**
  - The NFQA Project monitors the proficiency of field personnel to make alkalinity, pH, and specific conductance field measurements, which assists field offices in identifying water quality analysts in need of training and/or instrumentation that needs replacing.
  - NFQA results for 2012 demonstrated that of the ~5,600 determinations: 96% of pH, 95% of specific conductance, and 92% of alkalinity measurements made by field personnel were satisfactory.
  
- **Precipitation Chemistry Quality Assurance (PCQA)**
  - Since 1978, the USGS has operated an external quality assurance (QA) project for the National Atmospheric Deposition Program (NADP) monitoring networks that includes an evaluation of laboratory proficiency, sample contamination, equipment performance, and field protocols that affect NADP data quality.
  - The NADP is comprised of over 100 federal, state, local, private, academic and tribal organizations which work collaboratively to operate over 400 atmospheric deposition monitoring sites in North America across six specialized NADP networks.
  - The PCQA project has been instrumental in advancing NADP networks through testing and gaining approval for new sampling technologies, improving field and laboratory protocols and enhancing interpretative products such as high resolution deposition maps.
  
- **Blind Blank Project (BBP)**
  - The BBP submits blind (unknown to the laboratory) blank samples to the inorganic and carbon sections at the USGS-NWQL, collecting blank contamination data on approximately 140 analytical determinations.
  - BBP analytical results are summarized weekly for the USGS-NWQL and used to monitor analytical performance and to calculate the long-term method detection levels (LTMDLs).
  - BBP data is available online and beneficial to USGS scientists wanting to quantify laboratory blank contamination.