SHALE GAS VOLUNTEER MONITORING PROGRAM
Monitoring Best Practices

Meter Care & Calibration

- Every day that you monitor, calibrate your meter.
- The protocol includes DUAL CALIBRATION.
    - Calibrate with 84 μS/cm solution first so the meter can perform more accurately when reading low conductivity values.
    - The 1,413 μS/cm solution calibrates the meter to a middle-range.
    - Check out the instructions online.
- Calibration fluid best practices:
    - Make sure it has not expired.
    - Invert fluid before calibration.
    - Screw cap on tightly after calibration so that the solution does not evaporate.
    - Dispose of solution after calibration.
    - Contact ALLARM if you need more solution.
- Allow the meter to stabilize in the solution before calibration.
- In cold weather, turn your meter on before testing your sample and allow it to get used to the cold air. This should help to stabilize the reading faster.

Testing

- Monitor your stream (conductivity, TDS, stage and visual assessment) at least once a month, even if the stream is dry or frozen over. It is important to note these conditions.
- Take pictures of your stream, especially in different seasons! This can serve as baseline data in the event of a spill.
- Record data at ALLARMwater.org. All of ALLARM's shale gas resources can also be found there.

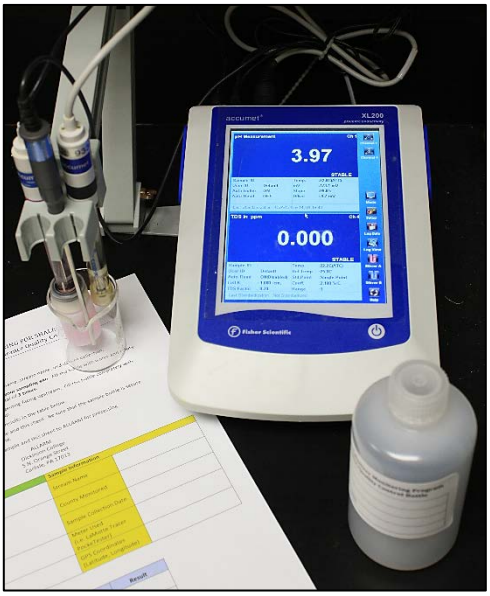
Measuring Stage

- Take the depth measurement at the same point every time you monitor your stream.
- Stage can also be found by measuring the distance between a bridge and the stream below.
- It is very important to measure from the same point every time!
- Always measure stage using the same method in order to be consistent.

Quality Assurance/Quality Control (QA/QC)

- For each site that you monitor, a water sample should be sent to ALLARM for quality assurance/quality control (QA/QC) after your initial training. Then you should send in a sample once a year.

Sending QA/QC Samples to ALLARM

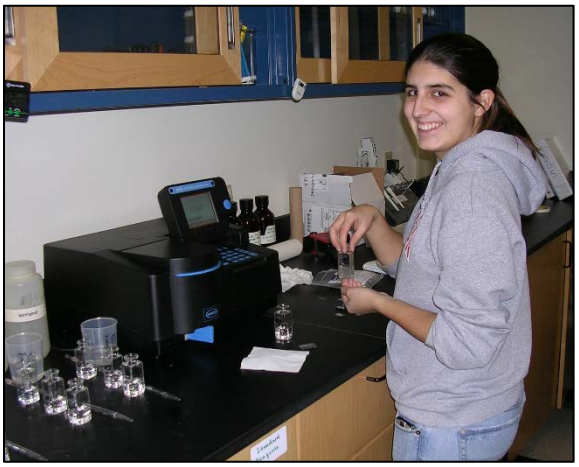


- Collect a water sample and fill out the QA/QC form (found on the database or in the Shale Gas Monitoring Manual).
- Mail your water sample and completed QA/QC form to ALLARM in a box, not an envelope.
- If you are sending > 10 water samples, please contact ALLARM so the lab can prepare for a large number of samples.
- Please do not send samples in January, May, August, or December. ALLARM's student lab coordinators do not work during these months, so it takes longer to complete the process.
- Contact ALLARM if you need QA/QC bottles.
- If/when you change your monitoring site, please send a new baseline QA/QC sample.

What ALLARM Does with QA/QC Samples

- When ALLARM receives a QA/QC sample, we will send out a confirmation e-mail to the monitor.
- Conductivity and TDS are tested with the LaMotte Tracer PockeTester, then the Fisher Scientific Accumet.
- If funding is available, your first sample that you send in is acidified and sent to a nearby certified lab for barium and strontium analysis.
- Results are emailed to volunteers. The QA/QC process up to this point takes about 2 weeks. Then, when the Ba/Sr results are received, we will pass that information on to you as well.

Barium and Strontium Analysis



- Depending on funding, baseline barium and strontium levels are analyzed when the first QA/QC sample is sent to ALLARM
- Ba/Sr analysis helps to determine if a pollution event from flowback water has occurred when you find an elevated conductivity reading.
- If you believe a pollution event has occurred:
    - Collect a sample ASAP and send to a local, certified lab.
    - Decision trees can help guide you with next steps and help determine if you have found a reportable event.