

Chemical Water Quality Monitoring

Data Collection and Safety Tips

CBEC, NREP and SSG teachers and their students gather data by conducting chemical water quality monitoring. The parameters of *dissolved oxygen, biochemical oxygen demand, turbidity, fecal coliform, temperature, pH, turbidity, nitrate, and total solids* are measured. The data collected is used as one means of assessing the impacts of human activities and helping to determine the health of our local watersheds. Data from student monitoring is considered "red flag data" which alerts other agencies of water quality issues. Data from further monitoring is a tool for sound watershed and community level decision-making and for evaluating the effects of our land and water uses decisions.

Many factors can affect the water quality of a river system. The conditions of a river can fluctuate periodically, so it is important to measure water quality periodically and look for trends. Water that is determined safe for one use may be unacceptable for another purpose.

Survey Design

If you suspect pollution entering the river from a point source, then it is a good idea to "bracket" the suspected site with at least three sampling locations. One site should be located just above the source to serve as a control site. Another should be located immediately below the source, and the third should be further downstream to serve as a recovery station.

If you are interested in how your river changes from the headwaters to the mouth, sampling sites should be dispersed along the length of your river so that changes in water quality can be noted. Take photographs or videos of your monitoring site as a way to record changes over time.

Where to Sample

- Confirm that the site is located within your delineated watershed. Select a site that is easy for you and your students to get to. This way you may be able to visit the site more frequently than just once or twice a year. Or select a site where an agency like the Washington State Department of Ecology is interested in receiving the data.
- Determine if the site is located on public or private property. Do you need to obtain permission before visiting the property to conduct water quality monitoring and watershed research? Consider monitoring sites that are public access points such as bridge or road crossings or public parks.
- It is important to exercise care in the way samples are collected for analysis. A collected sample should be representative of the river reach being tested. Analytical values derived from river samples may vary with depth, velocity of current and the distance the sample was taken from the shore.
- A rule of thumb for sampling is to sample midway across the river and below the surface. It is best if you can sample in the main current, as long as it is safe to do so. Since near-shore samples may not be representative of the entire river, you may want to consider collecting samples from a bridge spanning a river, or from a dock.
- Be alert for spawning areas (redds) in the stream. Do not walk on them. They will look like a round area of clean gravel about 1 to 3 feet long.

Safety Tips

- Refer the **Materials Safety Data Sheets/CD's (MSDS)** included with each water quality test kit. This information provides specific first aid and chemical information should someone accidentally ingest or if one of the chemicals comes in contact with someone's eyes or skin. MSDS Sheets could be reproduced in teacher's notebook and displayed for others to see.
- Ensure that students and others understand from the beginning the danger of treating chemicals casually or endangering others during "horseplay." Review with your students the hazard signal words found on the labels of each of the chemicals.
- Make it a practice for your students to always wear well-fitting non-latex or rubber gloves and safety goggles when sampling and conducting tests. Wash your hands with soap when you are done with the testing. Avoid placing hands in contact with eyes or mouth during monitoring.
- Identify a monitoring site that is a safe distance from any nearby roads or traffic.
- Be aware of nearby land uses or structures such as sewage treatment plants, which may require special covering of arms and hands for monitoring. Do not monitor if the water appears to be badly polluted or is posted against swimming.
- Have a cell phone and a first aid kit handy. Know any important medical conditions of students (allergies to bee stings or grass, etc.) and bring any needed medications.
- Use tarps to set up the "monitoring areas." This way you can keep track of all testing equipment as well as to protect the area in case of accidental spills.
- Check for any habitats or shelters near your monitoring site where animals may be living, such as snake holes, or beaver dams, burrows, snags, etc.
- Avoid deep water or fast currents for conducting monitoring, unless standing on a bridge. Locate riffle areas instead, which would likely support a greater abundance of aquatic life.
- Stay out of the stream as much as possible. Teachers or other adults may be the only people in the water gathering samples. Stream bottoms are slippery, can contain deep sinkholes, and can also have sensitive habitats (salmon redds) and should not be disturbed. If students do help collect samples have these selected students outfitted with waterproof boots or hip waders to collect the water samples.
- Bring liquid and dry waste containers with you. Dispose of spent liquid chemicals down a sink with plenty of water.
- Use gloves and trash picker uppers to safely pick up garbage that you may find at your monitoring site. Take your trash and recycling back to school with you.
- Use the existing trails and paths at your monitoring site. They will help keep you from getting lost and help protect fragile areas.