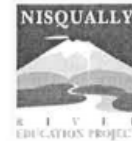


## QUALITY ASSURANCE/QUALITY CONTROL PROTOCOLS FOR CBEC, NREP, and SSG



### QUALITY ASSURANCE

Quality Assurance (QA) procedures help assure the accuracy and precision of monitoring data.

#### Quality Assurance procedures for SSG and NREP:

1. Provide quality training for teachers
2. Provide teachers with water quality monitoring test kits
3. Create a Quality Assurance Project Plan

#### **Quality Assurance Project Plan:**

A Quality Assurance Project Plan (QAPP) is a written document that outlines the procedures a monitoring project will use to ensure that the samples participants collect and analyze, the data they store and manage, and the reports they write are of high enough quality to meet project needs. In essence, a QAPP is the written record of the QA/QC procedures. Please request a copy of the QAPP from your program coordinator if you would like to peruse this detailed information more thoroughly.

#### A QAPP answers the following questions:

**Who** is monitoring?

**What** tests will be conducted?

**When** will the tests be conducted (date, time, weather, etc.)?

**Where** is monitoring happening?

**Why** are we monitoring (goals)?

**How** can we be sure this is good data (Quality Control measures taken)?

### QUALITY CONTROL

Quality Control practices are techniques used to evaluate and control errors in measurements.

There are two types of error:

1. Bias or Systematic Error is the difference between your measurement and the actual amount. Tests for this type of error include check standards (samples of known amounts) and test blanks.
2. Precision or Random Error is the consistency of your measurements (how close are your three replicate samples to each other?). Precision is tested by conducting multiple analysis of the same samples.

And remember that Accuracy is also important!



## QUALITY CONTROL TECHNIQUES



### Replicate Samples-

Sampling error may be the largest source of error (bias) in the sampling process, yet it cannot be measured directly. Estimates can be made by checking the amount of difference in three samples from the same location.

#### Procedure:

Take 3 different samples of river water (from the same location and at the same time). Have one person conduct the analysis for tests from all 3 collection bottles. For example, have one student conduct pH tests from bottle #1, then conduct pH tests from bottle #2, and then #3.

### Method Blanks-

A test for contamination of lab equipment, calibration of your method, and in some cases lowest detectable limits. **This is especially important for fecal coliform testing!**

#### Procedure:

Use a distilled or autoclaved solution in place of a river sample as the first analysis of the laboratory procedure, process all river samples and then compare to ensure the first solution was sterile.

### Field Blanks-

A test to determine if there is contamination from sampling containers, sampling equipment, transportation, or handling procedures.

#### Procedure:

Fill sample bottle with distilled or distilled water. Test the water just the same as a river sample. If sampling equipment is used for more than one sample, then you may wish to use a second field blank at the end of the sampling period. Follow the same rinsing procedure as you would for a river sample, but use distilled or distilled water as the sample.

### Split Samples-

Operator error in analysis is a primary source of error (precision estimate). It cannot be measured directly, but estimates can be made by comparing analysis results from two or more operators.

#### Procedure:

- **For pH, nirates, phosphates, turbidity-** Shake the collection bottle vigorously before pouring the sample in to test kit vials. Run each test three times from the same collection bottle. Have different people analyze the samples and compare results.
- For Dissolved Oxygen-
  1. Fix the sample in the collection bottle and then run the test three times with different people running the tests  
-OR-
  2. Fill two dissolved oxygen bottles at the same location in the stream at the same time. Run the two tests simultaneously and compare results. This is not exactly a "split sample", but it is close.

