CCPaSEC

Centre County Pennsylvania

Senior Environmental Corps

The mission of the Centre County Pennsylvania Senior Environmental Corps (CCPaSEC) is to develop and to support teams of senior citizens who gather and publish data on the quality of water in the streams of Centre County. Through public outreach, with the assistance of the ClearWater Conservancy, the Centre County Conservation District, Nature Abounds, and other environmentally concerned organizations, CCPaSEC seeks to keep the public informed of the importance of clean water and how the management of our civil and natural resources affects the quality of streams in the county.

2017 Equipment Check

Percent Recovery

Ken Johnson Jan 2017

The CCPaSEC Quality team conducted our yearly Equipment Check on January 27, 2017.

QC Team:

Rob Fugate, Dave Truesdale, Dan DeLotto, Ralph Locklin, Lou Mayer, Mick McKay, Ken Johnson.

We collected all seven (7) the CCPaSEC teams' field kits for this exercise. The Quality team met at Dan DeLotto's home at 9:30 am.

Procedure:

The CCPaSEC Equipment Check procedure is available on our WEB page:
http://www.ccpasec.org/

All seven field kits were examined by our Quality volunteers.

- Physical condition of the equipment.
- Repair and maintenance as required.
- Determination of the Percent Recovery

Equipment:

- pH meters – HACH (135 minilab) and Oakton (PCS Testr35): pH, Conductivity
- Colorimeter Hach DR/850 Nitrate, Sulfate & Phosphate
- Dissolved Oxygen YSI Model 550A-12
- Flow Meter Flowatch

Observations:

One of the previously identified HACH (135 minilab) had to be replaced. It appeared that the batteries had failed and leaked perhaps do to emersion and failure of the gaskets.

One Flow Meter impeller that had been repaired was replaced with a new one.

Three of the Flow Meters needed to be reset to the proper units of measure.

Some of the Field manuals were missing or not current.

All instruments' batteries were Ok.

Results:

Percent Recovery (PR) is a measure of the capability of the data measurements of our equipment. Our Quality Control plan calls for testing all of our test equipment each year. The Nature Abounds Quality Plan established PR goal is to be between 90% and 110%.

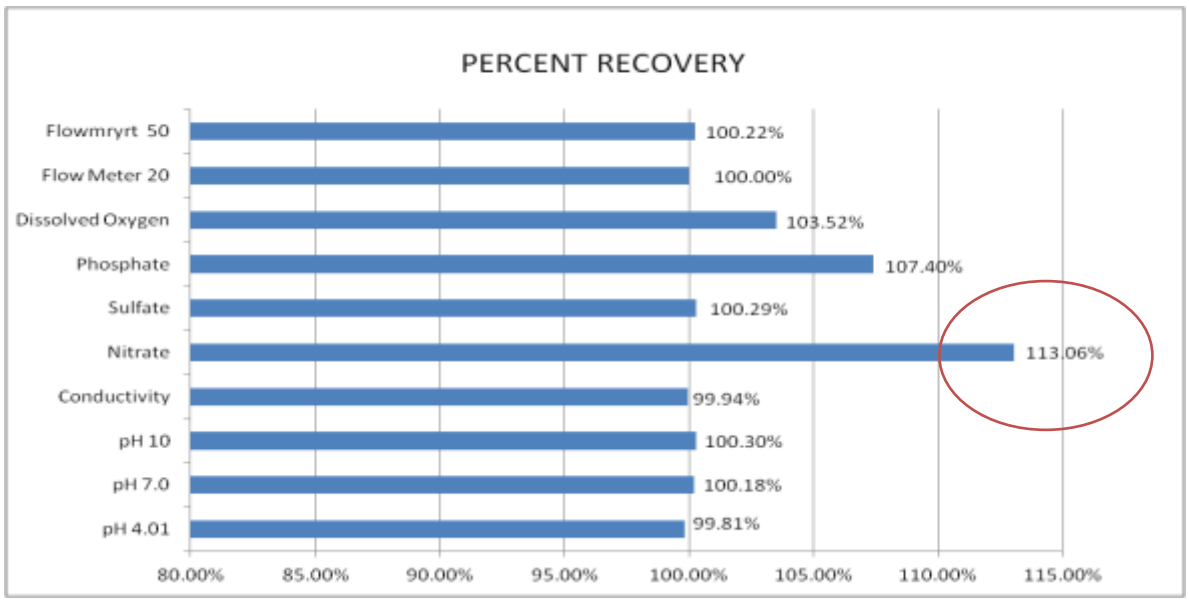
Percent Recovery $PR = \frac{Mean}{Standard} * 100$

Where the *Mean* is the mean (average) value of the measurements made with our equipment and the *Standard* is the value specified on the standard label.

The tests are performed against standards for pH, Conductivity, Nitrate, Sulfate and Phosphate. We use a common water sample for dissolved oxygen and a Zero Oxygen standard. The Flow Meters were evaluated electronically for linearity.

Our Equipment Check Percent Recovery (PR) for High Nitrate was corrected *(appendix I) for* our Cadmium Reduction test method. The Sulfate and Phosphate tests were also corrected as it is recommended that if we want to improve the accuracy of our Percent Recovery tests we should do the Reagent Blank correction (*Appendix I*) for each Standard and Reagent.

Nature Abounds recognizes the capability of the equipment they provided us. They instructed us that our field measurements do not require the corrections for the Reagent Blank that would need to be done for each lot of reagent and each field measurement. By maintaining our procedures and Data format our published data is consistent and can be compared over time. Our Quality Reports provide users a measure of the quality of the data. If there is a sudden or profound change in a stream we can notify the proper authorities.



Conclusions:

All seven field kits were well maintained by our volunteers and were returned to the team leads.

The 2017 Percent Recovery results are close to being within Nature Abounds goals and may be, if within our measurement error. The goal for our Nitrogen was 3.77% above the target. Nature Abounds was notified of the result and of our corrective action. We have noted the difficulty in completely emptying the Nitrate Powder Pillows. This can result in lower readings that would affect our Relative Percent Deviation and Field data.

The Field Kits were returned to the “keeper” Team leaders.

The Team Leads are asked to update and include the latest field manuals for the kits. The latest manuals are available on our CCPaSEC WEB site.

Appendix I

HACH *recommended Formula for Correction of Differences for Cadmium Reduction Method of Nitrate Analysis;*

A=True Concentration of the Sample
B=Concentration of the Reagent Blank (what you get when you run Deionized water as a sample).
C=Observed Concentration of the Sample
D=True Concentration of the standard
E=Observed Concentration of the standard
*A = (C - B) * [D / (E - B)]*
So, when you get your new lot of NitraVer 5 Nitrate Powder pillows, you should run a test on deionized water, to see what color the powder pillows read as. This is your reagent blank (B). If you get a result of .5 mg/L, then B would be equal to .5 mg/L.

When you test your samples, you will also test a standard solution at the same time. Be sure to shake the sample cells all the same. Take a Hach standardized solution of Nitrate and run it through the test. The number you get is your (E) in this equation. Let's presume you got 12 mg/L.
on a 10 mg/L standard. Because your standard is supposed to be 10 mg/L (that's what it says on the box), the true concentration of your standard (D) is 10 mg/L. This is your D value.

With all that in mind, run your sample (C). Imagine that you get a result of 15 mg/L. This is your C, or the Observed Concentration of your sample. So,

*A = (15 - .5) * [10 / (12 - .5)]*
*A = (14.5) * [10/11.5]*
*A = 14.5 * .87*
A = 12.6 mg/L

And THAT is the true concentration of the sample that initially read 15 mg/L.