

# Centre County Pennsylvania Senior Environmental Corps 2020 Equipment Check & Percent Recovery

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, and other environmentally concerned organizations, CCPaSEC seeks to keep the public informed of the importance of clean water and how the management of our natural resources affects the quality of streams in the county.

Our Quality Control team evaluates our equipment every year. Our field equipment cannot achieve laboratory levels of accuracy. Users of our data need know the limitations of our field equipment to correctly comprehend our data.

We collect all of our field kits early in the year to evaluate and report on the condition and capabilities of our equipment. This year CCPaSEC undertook a project to equip each team with their own field kit. That brought the total number of kits to review from the previous year's 7 to 12.

**We thank the Bald Eagle State Park Service who provided us with the room and facilities to conduct this year's program.**

The results are important to users of our data and demonstrate that our equipment is functioning well.

**The CCPaSEC Quality Control team conducted our yearly  
Equipment Check on January, 22 2020.**

Eleven (11) CCPaSEC teams' field kits were collected and evaluated in the exercise. The twelfth kit is available for a new team.

Procedure:

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

The field kits were examined by our Quality Team volunteers for:

- Physical condition of the equipment.
- pH meters - pH & conductivity, ( $\mu\text{S}/\text{cm}$ )
- Colorimeter - Nitrate, Sulfate & Phosphate, (mg/L)
- Dissolved Oxygen (mg/L)
- **FLOWATCH**<sup>®</sup> flow meter, velocity (cm/Sec)

The process includes replacing all batteries and maintenance as required.

The results are presented as Percent Recovery (PR) which is an indicator of our equipment capability.

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

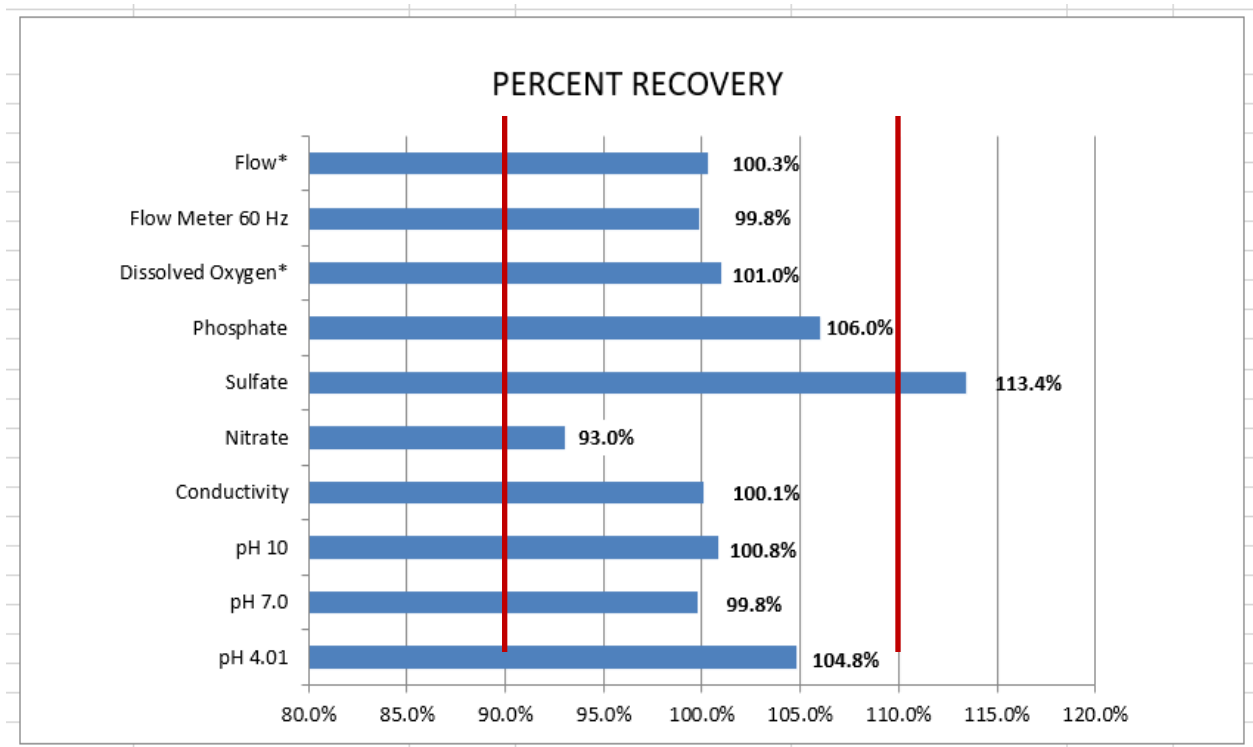
Where the mean is the average value of the parameter measurements and the standard is the value of the standard solution shown on the bottle label.

EASI (Environmental Alliance for Senior Involvement), and Nature Abounds established a Percent Recovery goal for all equipment be within the range of 100 +/- 10 %.

We evaluate our kit's colorimeter and pH meters with a traceable standard solution. We do not have standards for the dissolved oxygen or FlowWatch® meters but use the mean value to compare the variation between kits.

### Results:

The goal for Percent Recovery is to be between 90 and 110 percent



The range (between the maximum and minimum recorded value) of the FlowWatch® meters for the frequency of calibration was 1.5 Hz, and the range of impeller flow velocity was 12.0 cm/Sec. The range of the YSDI dissolved oxygen meters was 0.98 mg/L.

Conclusion:

Only the sulfate result exceeded the goal. It was only by 3.4 percent, which may be within our margin of measurement error.

Some of the equipment that was evaluated during this year's check was in need of cleaning.

The Field teams have been reminded to inspect their equipment before use in accordance with our protocol.

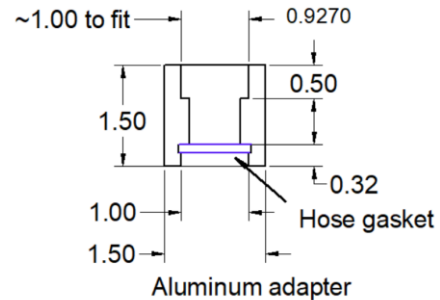
Our protocol\* calls for the teams to inspect the pH meter probe, dissolved oxygen probe, colorimeter sample cell cavity and the flow meter turbine (impeller) before use.

*\*See "Equipment Precautions and Maintenance" under our website: "Hot Training Tips".*

We replaced the **FLOWATCH**<sup>®</sup> flow impellers that were previously repaired with tape with new factory ones.

We added a new test for the **FLOWATCH**<sup>®</sup> meters this year to help determine the condition of impellers. The impellers (tiny fans) spin rate determines the velocity of the flow.

## **FLOWATCH<sup>®</sup>** Impeller test adapter



We made the custom fitting for the **FLOWATCH<sup>®</sup>** impeller using a brass garden hose adapter and machining a short piece of an aluminum bar. The hose fitting was epoxied to the aluminum adapter.

The test procedure is to attach the fixture to a sink faucet. Set the flow to approximately 100 Cubic cm/sec. Hold the flow impeller against the adapter gasket and record the average meter velocity reading (cm/sec).