

Appendix A. Sassafras Samplers Water Testing Procedures – SMART Colorimeter testing instructions

A.) Using the black PLASTIC test kit, at the field site:

- 1.) Collect & “fix” three samples for Dissolved Oxygen testing.
- 2.) Fill plastic bottle with sample for meter tests.
- 3.) Take temperature readings.
 - Air
 - Water
- 4.) Complete field observation sheet.

Using the SMART Colorimeter & collected samples from the field, analyze samples for:

- 1.) Nitrate-Nitrogen (NO₃-N)
- 2.) pH
- 3.) Ammonium-Nitrogen (NH₄-N)
- 4.) Phosphate
- 5.) Turbidity

Dilution procedure

If any samples are determined to be “Overrange” on the colorimeter, dilute and re-analyze the samples following the dilution procedures provided in the Test Instructions. In addition, based on results from previous sampling, samples from certain test sites, as identified by the Riverkeeper® prior to each monthly sampling, will be diluted before reaction and analysis.

Dilution will provide a numerical result for the test site rather than “overrange.”

Dilution procedure

- a.) Fill the titration tube used for the dissolved oxygen testing to the 5-mL line with the river sample.
- b.) Add distilled water up to the 25-mL line. The sample has now been diluted by 5x. [NOTE: Distilled water purchased in the store for ironing is perfect for dilution purposes.]
- c.) Continue with Reaction and analysis using this diluted sample.

SMART Colorimeter testing procedures

1) Prepare the Blank

- a.) Select a clean test vial (#0290). Using the plastic bottle of water collected above, fill test vial to 10 ml line.
- b.) Cap vial with the **YELLOW** cap. This is your BLANK sample for all tests, except TURBIDITY.

2.) Nitrate-Nitrogen test

Reaction and analysis procedures

- a.) Select the **Nitrate-N** test cube
- b.) Fill test tube #0898 to the **5 ml** line with sample water.
- c.) Add **Mixed Acid Reagent #V-6278** to **10 ml** line.
- d.) Cap with blue plastic plug & invert **5** times. **Wait 2 minutes.**
- e.) After waiting, pour solution from above into a clean meter vial #0290.
Using 0.1 gram spoon (#0699), add **2 spoons** of Nitrate Reducing Reagent (#V-6279).
- f.) Cap. Mix by inverting tube **50 – 60** times a minute for **4 minutes.** (Use a timer or clock with a second hand to accurately invert once per second.)
- g.) After mixing for 4 minutes, **wait 10 minutes** for the color to develop.
[NOTE – At the end of the waiting period an undissolved portion of Nitrate Reducing reagent may remain without affecting test results.]

Prepare Meter for testing while waiting for color to develop in

Nitrate sample. [Note - Meter has been pre-programmed to complete tests in a specific order. Meter runs on 9V battery, or AC adaptor.]

- h.) Press **ON** button for 2 seconds to turn meter on. Press the * button to select start. Press * button again to select Testing Menu.
- i.) Select **Sequence 1** from test menu by using up or down arrows to direct * to Sequence 1. Press * button to start sequence 1.
- j.) The display will show, **064 Nitrate-N L.** Press * button to begin Nitrate-N test. The * will be on SCAN BLANK.
- k.) Select the BLANK sample vial with the **YELLOW** cap from Meter procedures step 1. Wipe vial with Kimwipe.
- l.) Insert cleaned BLANK vial into light chamber. Close light chamber lid. PRESS * button.
- m.) Display will read BLANK DONE. Remove BLANK vial with **YELLOW** cap and set aside. The * will be on SCAN SAMPLE.
- n.) Select reacted sample from **Reaction and Analysis step g.** Wipe reacted sample vial with Kimwipe. Insert cleaned vial into light chamber.
- o.) Close the light chamber lid. PRESS * button.
- p.) Record concentration value as ppm Nitrate-Nitrogen. **For samples which have been diluted, multiply the concentration value on the meter by 5 to account for the dilution.** Record calculated concentration value as ppm Nitrate-Nitrogen.
- q.) The * will be on NEXT TEST. Press the * Button. The display will show **075 PH PR.**

NOTE – Reacted Nitrate-Nitrogen sample contains Cadmium. Empty reacted vial into container marked **CADMIUM WASTE.** Fill vial half way with tap water and rinse

measuring spoon in vial. Empty into **CADMIUM WASTE** bottle. Vial & spoon should be washed completely with other items at end of testing session.

3.) **pH test**

- a.) The * will be on SCAN BLANK.
- b.) Wipe BLANK vial with **YELLOW** cap with Kimwipe. Place cleaned vial in the light chamber. Close light chamber lid. PRESS * button.
- c.) Display will read BLANK DONE. Remove BLANK vial with **YELLOW** cap and set aside. The * will be on SCAN SAMPLE.
- d.) Rinse a clean test vial (#0290) with sample water.
- e.) Fill rinsed vial to the **10 ml** line with sample.
- f.) Select **pH** test cube.
- g.) Using pipet (0369), add **0.5 ml** of Phenol Red Indicator (#V-2304). Cap and mix.
- h.) Wipe vial with Kimwipe. Insert cleaned, reacted vial into meter.
- i.) Close light chamber lid. Press * button to SCAN SAMPLE. Record pH result.
- j.) The * will be on NEXT TEST. Press the * Button. The display will show **005 AMMONIA-N H.**

4.) **Ammonium-N test**

- a.) The * will be on SCAN BLANK.
- b.) Wipe BLANK vial with **YELLOW** cap with Kimwipe and place cleaned vial in the light chamber. Close light chamber lid. PRESS * button.
- c.) Display will read BLANK DONE. Remove BLANK vial with **YELLOW** cap and set aside. The * will be on SCAN SAMPLE.
- d.) Rinse a clean test vial (#0290) with sample water.
- e.) Fill rinsed vial to the 10 ml line with sample.
- f.) Select Ammonia-N test cube.
- g.) Add 8 drops of Ammonia Nitrogen Reagent #1 (V-4797) to vial. Make sure to hold upside down bottle vertically when adding drops.
- h.) Cap and mix. Wait 1 minute.
- i.) Use 1.0 ml pipet (#0354) and add 1.0 ml of Ammonia Nitrogen Reagent #2 (V-4798) to vial.
- j.) Cap and mix. Wait 5 minutes for color to develop.
- k.) After waiting 5 minutes, clean outside of vial with Kimwipe. Insert cleaned, reacted vial into light chamber.
- l.) Close light chamber lid. Press * button to SCAN SAMPLE.
- m.) Record result as Ammonia-N ppm.
- n.) The * will be on NEXT TEST. Press the * Button. The display will show **078 PHOSPHATE L.**

5.) **Phosphate**

- a.) The * will be on SCAN BLANK.

- b.) Wipe BLANK vial with YELLOW cap with Kimwipe and place cleaned vial in the light chamber. Close light chamber lid. PRESS * button.
- c.) Display will read BLANK DONE. Remove BLANK vial with YELLOW cap and set aside. The * will be on SCAN SAMPLE.
- d.) Rinse a clean test vial (#0290) with sample water.
- e.) Fill rinsed vial to the 10 ml line with sample.
- f.) Select Phosphate test cube.
- g.) Using 1.0 ml pipet (#0354), add 1.0 ml of Phosphate Acid Reagent (#V-6282). Cap & mix.
- h.) Using 0.1 gram spoon, add 1 measure of Phosphate Reducing Reagent (V-6283). Cap and shake until powder dissolves.
- i.) WAIT 5 Minutes for color to develop.
- j.) At the end of the wait time, wipe reacted vial with Kimwipe. Insert cleaned, reacted vial into light chamber.
- k.) Close light chamber lid. Press * button to SCAN SAMPLE.
- l.) Record result as Phosphate ppm.
- m.) The * will be on NEXT TEST. Press the * Button. The display will show **098 TURBIDITY.**

6.) TURBIDITY

- a.) The * will be on SCAN BLANK
- b.) Wipe sealed vial with BLUE cap using a Kimwipe. This vial contains distilled water and will be the TURBIDITY blank.
- c.) Insert vial with BLUE cap into light chamber. Close light chamber lid. PRESS * button.
- d.) Display will read BLANK DONE. Remove vial with BLUE cap and set aside. The * will be on SCAN SAMPLE.
- e.) Rinse a clean test vial (#0290) with sample water.
- f.) Fill rinsed vial to the 10 ml line with sample water. Cap vial.
- g.) Wipe vial with Kimwipe. Insert cleaned, vial with sample water into light chamber.
- h.) Close light chamber lid. Press * button to SCAN SAMPLE.
- i.) Record result as TURBIDITY in FTU.
- j.) The display will show END OF SEQUENCE. The * will be on SHUT DOWN. Press the * Button. The meter will turn off.

TESTING with the meter is now complete.

Please follow separate instructions for testing **DISSOLVED OXYGEN**. Repeat test three times and record values as Oxygen in ppm.

Thoroughly clean all testing equipment.

DO NOT use Detergent. Rinse with tap water and allow components to air dry.

For additional supplies, please contact your Riverkeeper @ 410 708 3303.

Thank you!
for your assistance with monitoring the Sassafras River.