



TEXAS STREAM TEAM

STANDARD CORE FIELD GUIDE – MONITORING PROCEDURES

Please note, instructions include the new TRACER gray conductivity meter. Email TxStreamTeam@txstate.edu if you need to upgrade your meter.

Equipment Needed

- Standard Core Kit (with unexpired reagents)
- Bucket
- Deionized (DI) Water
- Waste Bin
- Gloves or Hand Sanitizer
- Conductivity Standard Solution (600 or 1413 μS)
- Transparency Tube (optional for shallow water)

At Site

1. Record *Field Observations* and *Comments* on Core Environmental Monitoring Form.
2. Hang thermometer out of direct sunlight, wait 2-3 minutes; record *Air Temperature* to nearest 0.5°C.
3. Measure *Transparency* by selecting a method below that is most applicable to your monitoring site:
 - A. Secchi Disc Transparency for deeper water, lower Secchi disc until it disappears, mark depth, then raise Secchi disc until barely visible, and mark depth again. Average depth readings and record to nearest 0.1 m.
 - B. Transparency Tube for shallow water:
 1. Rinse bucket and tube 2X with sample water.
 2. Standing in the centroid of flow of the waterbody and downstream of the tube, dip the tube into the water facing upstream to fill.
 - a. If centroid is not accessible, or the waterbody is unsafe to stand in, use a bucket to collect sample water and pour into the tube immediately after collection to prevent settling of suspended materials.
 3. Holding the tube vertically, look down the tube to see if the disc at the bottom is visible. If disc is not visible, release water until visible and record the water level in meters on Monitoring Form.
 - a. If the tube is filled to the top and the disc is completely visible, record the measurement as > the maximum tube length (>1.2 m or >0.6 m).

4. Measure *Total Depth* by lowering Secchi disc into water until cord becomes slack, then raise until straight. Mark and record to 0.1 m.
5. Conduct bucket grab, rinse bucket 2X with sample water and discard water downstream.
6. Measure *Water Temperature* in the bucket sample with thermometer for 1-1/2 minutes. Read thermometer while in water to the nearest 0.5°C.

Conductivity

Record the Conductivity Standard Solution value under *Standard Value* in the *Conductivity/Salinity* row on Monitoring Form.

Pre-Test Calibration

1. Rinse beaker and meter 2X with Conductivity Standard Solution.
2. Fill beaker with 20-50 mL of conductivity solution, insert meter and stir gently to remove bubbles from probe.
3. Turn meter on WHILE SUBMERGED and slowly stir for 2 minutes.
4. Make sure the meter is in conductivity mode. A small " μS " (microsiemens) symbol will appear. If meter is not in μS , press and hold the MODE button and toggle through until " μS " is displayed.
5. Record the *Standard Temperature* and *Pre-Test Calibration Initial Reading* on the Monitoring Form.
6. Press and hold the CAL button until "CAL" appears in the lower display. Release button. When calibration is complete, the meter automatically displays "SA," then "End" and returns to normal operation mode. The meter is now calibrated and should display the calibration Standard value. Record the Standard value under *Calibrated To* on Monitoring Form.
7. Rinse beaker and meter 2X with DI water.

Measurement

1. Rinse beaker and meter 2X with sample water.
2. Fill beaker with 20-50 mL of sample water, insert meter, and remove bubbles. Turn meter on and stir gently for 2 minutes. Stop stirring, hold meter 1/2

inch off bottom and sides, record reading under *Conductivity ($\mu\text{S}/\text{cm}$)*.

3. Turn meter off while submerged and rinse 2X with DI water.

Post-Test Calibration

1. Rinse beaker and meter 2X with Conductivity Standard Solution.

2. Fill beaker with 20-50 mL, insert meter, and remove bubbles. Turn meter on and stir gently for 2 minutes. Stop stirring, hold meter $\frac{1}{2}$ inch off bottom and sides, record reading under *Post-Test Calibration Initial Reading* on Monitoring Form. The difference between the *Calibrated To* value and the *Post-Test Calibration Initial Reading* should fall within $\pm 20\%$ of the calibration standard solution error limit.

3. Turn meter off while submerged, rinse 2X with DI water, and replace cap.

Dissolved Oxygen (DO) Measurement (Titration Method)

1. Rinse 2 sample bottles and caps 2X with sample water.

2. Fill each bottle with sample water and cap below sample water surface, check for air bubbles.

Fixing the DO Sample:

1. Add 8 drops Manganous Sulfate Solution to each bottle. The bottle will overflow slightly.

2. Add 8 drops Alkaline Potassium Iodide Azide. Cap both bottles, slowly invert 25 times. Allow precipitate to settle below the shoulder of the bottles, then invert 10 more times and allow settling again.

3. Add 8 drops Sulfuric Acid. Cap both bottles and slowly invert for minimum of 3 minutes or until reagent and precipitate dissolve. Sample is now "Fixed" and can be finished at home within 4 hours if weather or other conditions warrant.

Titration of the DO Sample:

1. Rinse 1 vial 2X with a small volume of fixed solution from sample #1. Fill vial with fixed solution from sample #1 to 20 mL line and cap. Repeat for sample #2 and set aside.

2. Ensure pink titrator tip is in place and fill titrator with Sodium Thiosulfate – the plunger ring should be at 0.0. Expel air bubbles from titrator barrel. Place titrator into hole on vial cap. Add 1 drop at a time of titrator solution to vial and swirl to mix after each

drop until the yellow-brown solution turns a pale yellow or straw color.

3. Uncap vial with titrator STILL INSERTED and keep tip suspended above mouth of vial. Add 8 drops of Starch Indicator Solution, cap vial, and swirl to mix.

4. Continue titration drops and swirls, 1 drop at a time, until the solution becomes clear. Check against white background for any remaining color.

5. Read and record total number of units at plunger ring to nearest 0.1 mg/L under *1st titration*. Eject remainder of titrator solution into vial and dispose of vial solution in waste container.

6. Repeat titration process (Steps 1-5) with fixed solution for sample #2 and record these results under *2nd titration*. The second result must be within 0.5 mg/L of the 1st titration, if not repeat steps 1-5 for sample #1. If error limit still isn't met repeat steps 1-5 for sample #2. If repeating steps 1-5 for both samples doesn't meet the error limit, collect a new bucket grab and start over from the beginning with step #1.

7. Calculate the average of both titration results to nearest 0.1 mg/L and record under *Dissolved Oxygen*.

8. Rinse DO bottles, titration vials, and caps 2X with DI water.

pH Measurement

1. Rinse 1 test tube and cap 2X with sample water.

2. Determine the type of pH viewer you are using:

- If using the Octet Comparator (2193 and/or 2196) or the Liquid Wide Range pH Viewer (2192), fill round test tube with sample water to the 5 mL indicator line.
- If using the Octa-Slide 2 Viewer (1101) with color bars (2196-01 and 2193-01) fill the square test tube with sample water to the 10 mL line.

3. Invert pH Wide Range Indicator bottle a few times to mix, add 10 drops to sample, cap tube, and invert 10 times.

4. Insert the tube in Color Comparator Viewer, remove cap, and hold up to white background. Estimate to nearest 0.1 s.u. and record under *pH*.

5. Rinse tube and cap 2X with DI water.