The Meadows Center for Water and the Environment
Texas State University

Texas Stream Team

STANDARD CORE FIELD GUIDE – MONITORING PROCEDURES

Please note, this Standard Core Field Guide is for those who have the ECTestr11 Dual Range beige conductivity meter. To upgrade to the new TRACER meter, email us at TxStreamTeam@txstate.edu

Equipment Needed

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

At Site

1. Record *Field Observations* and any *Comments* on monitoring form.

2. Hang thermometer out of direct sunlight, wait 2-3 minutes before recording *Air Temperature* to nearest 0.5℃.

3. Measure the water's *Total Depth*. Lower Secchi disk into water until cord becomes slack, then raise until straight. Mark and record to 0.10 m.

4. Measure *Transparency* by selecting a method below that is most applicable to your monitoring site:

A. *Secchi Disk Transparency* should be used in deeper waters. Lower Secchi disk in water shaded from the sun until it disappears, mark depth, then raise Secchi disk until barely visible, and mark depth again. Average both depth readings and record to nearest 0.10 meter (10 centimeter).

B. *Transparency Tube* should be used in shallow waters:
   1. Rinse bucket (if needed) and tube twice with sample water before each use.
   2. Standing in the centroid of the waterbody and downstream of the tube, dip the tube into the water facing upstream to fill it, being careful to not disturb the streambed or kick up any sediment.
      a. If you cannot access the centroid, or the waterbody is unsafe to stand in, you can use a bucket to collect sample water and pour into the tube. Be careful to not scrape the streambed or disturb or kick up sediment. Carefully pour the water collected in the bucket 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 disk at the bottom of the tube is visible. If you can see the disk, record the water level in centimeters on the monitoring form
      a. If the tube is filled to the top and the disk is completely visible, record the measurement as > the maximum tube length (i.e., >120cm or >60cm).
   4. If you are unable to see the disk, release water from the tube until the disk becomes visible. Record the water level in centimeters at which the disk becomes barely visible on your monitoring form.

5. To collect a bucket grab, rinse bucket TWICE and discard water downstream. If the water depth at the sampling point is <0.5 m (a little over 1.5 feet), collect samples at a depth equal to 1/3 of the water depth measured from the water surface. If the water depth is >0.5 m, collect samples at a depth of 0.3 m (about 1 foot) below the surface.

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℃.

Conductivity

Calibrate conductivity meter with Conductivity Standard Solution in a temperature-controlled environment no more than 24 hours before/after use. Record Conductivity Standard Solution under *Standard Value* in the *Conductivity/Salinity* row of the *Instrument Calibration* section on monitoring form.

Calibration (ECTestr11 Dual Range Meter Only)

1. Using Conductivity Standard Solution, rinse beaker and meter probe TWICE.

2. Hold beaker by top edge and fill to 20 mL level on beaker, insert meter probe and stir gently to remove bubbles from probe.

3. Turn meter on WHILE IN CONDUCTIVITY STANDARD SOLUTION. Slowly stir for 2 minutes.

4. Read temperature from probe while in solution and record *Standard Temp* (°C) on monitoring form.

5. Hold meter probe 1/2 inch off bottom and sides and record *Pre-Test Calibration Initial Reading* or *Post-Test Calibration Initial Reading* depending on whether you are conducting the pre- or post- test calibration.

6. For pre-test calibration, if meter is not reading the Conductivity Standard value, adjust buttons underneath the meter cap until the reading is equal to or within 10 units of the Standard value. Turn meter off while submerged and record the value the meter was adjusted to under *Calibrated To* on monitoring form. Proceed to Measurement.

7. For post-test calibration, you are finished once you record the *Post-Test Calibration Initial Reading* in
Step 5. Compare the difference between the *Calibrated To* value from Step 6 and the *Post-Test Calibration Initial Reading* from Step 5 to ensure it meets the error limits (±20% of calibration Standard value).

8. Rinse meter probe with DI water and replace cap.

Measurement

1. Rinse beaker and meter TWICE with sample water, discard water downstream or in waste bin.

2. Fill beaker with 20 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* (µS/cm). Turn meter off while submerged, rinse with DI water, and replace cap.

3. Conduct post-test calibration (repeat Calibration steps above).

Dissolved Oxygen (DO)

Measurement (Titration Method)

1. Put on safety goggles and gloves and uncap both bottles (sample #1 and #2). Rinse sample bottles and caps TWICE in bucket sample water, dispose of rinse water downstream or in waste bin.

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 bottle, 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. Check for any solids remaining. Sample is now "Fixed" and can be finished at home within 4 hours if weather or other conditions warrant.

Titrating the DO Sample:
1. Rinse 1 vial TWICE with a small portion of fixed solution from sample #1. Dispose of rinse solution in waste container. 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. Expel air bubbles from Titrator barrel. The plunger ring should be at 0.0. Replace pink titrator tip. Place titrator into hole in vial cap. Add 1 drop of titrator solution to vial and swirl to mix. Add another drop and swirl. Repeat until the yellow-brown solution turns a pale 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.* This second result must be within 0.5 mg/L of the 1st titration.

7. Calculate the average of both titration results to nearest 0.1 mg/L and record under *Dissolved Oxygen*. Rinse both DO bottles, titration vial, and caps with DI water before storing in kit.

pH

Measurement (Color Comparator Method)

1. Rinse test tube and cap TWICE in bucket sample water.

2. Fill tube with sample water to indicator line (5 mL).

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 with DI water before storing in kit.

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