

WATER MONITORING QUICK START

At Check Out

- Is everything on the checklist in the box? Don't forget gloves!
- If you aren't going to monitor immediately, place the cold pack in your freezer at home.
- Did you bring a digital camera (not required but encouraged)?
- Did you record the instrument numbers on the data sheet and initial the checklist?**

At the Monitoring Site

- Look for your "representative flow" point from the shore. Remember it is where the current is running freely toward the middle of the creek or river. It also looks "representative" of the site. However, due to the size of the river and tributaries, it is not often possible to reach the "representative flow" if it's towards the middle. If at all possible, use the same flow point that your team used before. If the river has flooded or remodeled your site, find another site close by. Extend the swing sampler pole as far as it will go and use that as your sample point. **SAFETY FIRST - Do not enter the river!! It is swift and cold much of the year!!**
- Hang the air thermometer on a nearby bush. Remove the blue cover.
- Fill the yogurt container with an inch of river water, uncap the pH and TDS meters, and place in container to condition the probes. (Meters should be off.) Let sit for about 10 minutes.
- Agree on tasks: Who's recording data? Who's doing what test? Who will be on Safety Watch?
- Team Talk to decide how to fill in top section of data sheet on weather & streamside conditions.

Doing the Tests

- Check air temperature. Record results. This is done 3 times within 20 minutes.
- Get a sample and test water temperature and pH. Repeat pH test for total of 3 readings. **Remember to get a new sample for each reading.** Record results. Turn meter off when done!
- Test TDS (formerly referred to as conductivity). **Remember to get a new sample for each reading.** Repeat test for total of 3 readings. Record results. **Turn pH and TDS meters off between each sampling and when done!**
- Get 3 separate samples from the river (or creek) for the DO test. Pour water from first sample into small glass sample bottle slowly and allow overflow to be sure no oxygen is added as you pour. Pour water from second sample into second small glass sample bottle and water from third sample into third glass sample bottle. Do the steps in sequence through adding the Sulfuric Acid for each sample so that all the samples are "fixed." **Make sure that precipitate has totally dissolved after adding sulfuric acid.** (The colder the water, the longer this takes). **Record the time when all 3 samples are "fixed"**. Then do the titration. (Remember: You *may* have to refill the titrator with the sodium thiosulfate to complete the titration – if so, just add whatever amount you use to 10 ppm.) **The pink tip should be kept on the titrator.** The titration process will be repeated for each sample. When titration is complete, record results. Pour chemicals into waste bottles – don't allow them to go into our river or creeks!
- Take grab sample for turbidity and **record the time on the data sheet.** Place in plastic bag with the cold pack (things can start to grow in a warm sample and that

will affect the turbidity readings). You'll turn the sample in with your kit. **Keep it cold until then.**

Taking Photos

- We would love photos of the team performing the tasks to update our files. Also, please take photos of any significant changes at or nearby your site. Wildlife photos are encouraged as well.

Before Leaving the Monitoring Site

- Are meters off, capped and back in box?
- Are all chemical bottles capped and back in DO kit?
- Is everything on the checklist back in the box?
- Is everything filled in on data sheet (equipment #, all data, date and time)?**
- Are all the team names on the data sheet?
- Who is responsible for returning the kit?
- Team Talk: how did things go? Write down any comments or suggestions to improve the process next time!
- Please remember to return the cold pack when turning in your turbidity sample.

THANKS!!

Contact numbers

Liana 379-2075
Anne 966-8393
Connie 966-7155

How to Use the Grab Sampler Pole

Use the Grab Sampler Pole to collect water for all your tests. The Merced River is dangerous during much of the year so plan on using this tool to collect water samples.

Water samples for all the tests should be collected from half-way down into the water column. Using the Grab Sampler Pole enables you to collect samples from this area.

Grab Sampler Pole Technique

- Pre-rinse the sampling bottle attached to the pole with creek or river water before each “grab”.
- Stand downstream of the representative flow point.
- Push the pole underwater so the sample comes from the middle of the water column.
- Be prepared for the push of the current; it may take two team members to control the pole.
- Allow the sampling bottle to fill with water and bring bottle to shore.
- Immediately test for water temperature, pH, and conductivity.
- **Get fresh water samples every time for each additional parameter; dissolved oxygen, turbidity, water temperature, etc.**

How to Measure Air Temperature

- First record the thermometer ID number on your data sheet.
- Remove the blue case and hang the thermometer on a tree branch in the shade for 10 minutes to equilibrate. Keep it away from cool water, hot rocks, and your body.
- To measure the air temperature, hold the thermometer at arm's length, shaded from direct sunlight, at eye level. Record the value on the data sheet.
- Recheck and record temperature two more times.
- Keep all readings within a 20 minute time frame.

How to Measure pH and Water Temperature

Fill yogurt container with 1" of river water. Remove meter cap and set upright in yogurt container (in shade) for 10 minutes with **power off** to pre-soak. Be sure water level stays below the meter's buttons.

- After pre-soaking, turn on meter: press and hold the "MODE" button until the LCD screen comes on.
- Dip the electrode into the water collected with the grab sampler. Do not wet above the cap line!
- Stir gently, until the readings stabilize. The probe automatically compensates for temperature, so it may take a couple of minutes for the values to stabilize. Be patient.
- *Read the value while meter is still in the sample water.* Record value on data sheet (and time of first sample only).
- Turn meter off and place back in soaking water in yogurt container between samples.
- Repeat twice more, for triplicate readings. Get a new water sample for each test.
- Turn off meter (press "MODE" button), replace cap, and place back in kit.

How to Measure Total Dissolved Solids (TDS)

Fill yogurt container with 1" creek water. Remove meter cap and set upright in yogurt container (in shade) for 10 minutes with **power off** to pre-soak the meter. Be sure water level stays below the meter's buttons.

- After pre-soaking, turn the TDS meter on, and dip the electrode into the water collected with the grab sampler. Do not wet above the cap line!
- Stir gently, until the readings stabilize. The probe automatically compensates for temperature, so it may take a couple of minutes for the values to stabilize. Be patient.
- *Read the value while the meter is still in the sample water.* Record value in parts per million (ppm) on data sheet (and time of first sample).
- Turn meter off and place back in soaking water in yogurt container between samples.
- Repeat twice more, for triplicate readings. Get a new water sample for each test.
- Turn off meter, replace cap, and place back in kit.

How to Measure Dissolved Oxygen (DO)

Set up your DO testing kit in a shady, flat area. Once you collect your samples, it is very important that you **immediately** proceed from Step 1 through Step 5 of these instructions. If you let your sample sit for any period of time, the amount of dissolved oxygen in the water can change, giving you inaccurate readings.

Follow each step precisely:

- Pre-rinse each DO sampling bottle with river/creek water.
- Get a water sample with grab sampler pole. Tilt the bottle and fill the sample bottle using the water taken with the arm. Do this slowly and fill bottle to the top (by tilting bottle up). Tap sides of bottle to remove any bubbles that appear in the bottle and cap bottle. Repeat two more times to fill all three bottles, each with a different water sample.
- **Put on gloves.**
- Using the LaMotte Dissolved Oxygen Test Kit (Triplicate samples may be run together through Step 5, adding each treatment to all 3 bottles consecutively):

Step 1: add 8 drops of **Manganous Sulfate Solution**

Step 2: add 8 drops of **Alkaline Potassium Iodide Azide**; some liquid will overflow out of the bottle.

Step 3: cap the sample bottle and mix by inverting several times. A precipitate will form. Set sample bottle down for a few minutes and allow the cloudy precipitate to settle below the shoulder of the bottle.

Step 4: Once precipitate settles, immediately add 8 drops **Sulfuric Acid 1:1**. Cap and gently invert the bottle to mix the contents until the solid precipitate and the reagent have totally dissolved (you shouldn't see any tiny red dots floating around). The solution will be clear yellow to orange if the sample contains dissolved oxygen.

Step 5: The sample has now been "fixed". **Record the time on the data sheet.**

Titration

(Titrate each sample separately)

- Pour a small amount of your fixed solution into the titration tube, cap, swirl around and then dump into the waste bottle. This pre-contaminates the tube and will need to be done with each sample before titrating.
- Fill the titration tube so that the meniscus of the liquid is at the 20 mL line with the fixed sample. Cap the tube with its flat lid.
- Depress plunger of the Titrator. **Do not remove the pink tip on titrator.**

- Insert the Titrator into the plug in the top of the **Sodium Thiosulfate, 0.025N** titrating solution.
- Invert the bottle and slowly withdraw the plunger until the shoulder of the plunger (the end in contact with the solution) is on the zero mark on the scale. **Note: If small air bubbles appear in the Titrator barrel, expel them by partially filling the barrel and pumping the titration solution back into the reagent container, or you can tap the side of the barrel to remove bubbles. Repeat until bubble disappears.**
- Turn the bottle upright and remove the Titrator.
- Insert the tip of the Titrator into the opening of the titration tube cap.
- Slowly depress the plunger to dispense the titrating solution. After every two drops, swirl the solution to mix in the sodium thiosulfate. Titrate until the yellow-orange color changes to a very pale yellow. Hold sample against a white sheet of paper to see color changes more accurately.
- Tap the Titrator to remove any drops of solution on the end, and then carefully remove the Titrator and cap. Do not disturb the Titrator plunger.
- Add 8 drops of **Starch Indicator Solution**. Gently swirl to mix in starch to sample solution. The sample should turn blue/purple.
- Cap the titration tube. Insert the tip of the Titrator into the opening of the titration tube cap.
- Continue titrating one drop at a time until the blue color disappears and the solution becomes colorless. Swirl after each drop is added. **Note: If the plunger tip reaches the bottom line on the scale (10ppm) before the endpoint color change occurs, refill the Titrator and continue the titration. Add the value of the original amount of reagent dispensed (10ppm) to the second volume when recording the test result.**
- Record the test result where the Titrator tip (where the plunger meets the solution inside the barrel) meets the scale. Have your partners check your reading so you all agree. Each minor division on the Titrator scale equals 0.2 mg/L. When testing is complete, discard titrating solution in Titrator into waste bottle.

Between samples, rinse titration tube with a small amount of the next sample to be tested. This avoids leaving trace amounts of sodium thiosulfate in the titration tube which could skew subsequent sample readings.

How to Collect a “Grab” Sample for Turbidity

- Remove the cap from the bottle just before sampling. Avoid touching the inside of the bottle or the cap.
- Pre-rinse the bottle on the grab sampler pole as well as the Turbidity bottle with river water. Then with the pole, collect a water sample 6 to 12 inches beneath the surface or mid-way between the surface and the bottom if the stream reach is shallow. Turn the bottle underwater to face upstream to fill it up. Try not to disturb the bottom of the streambed.
- Fill turbidity bottle; leave a small air space, so that sample can be shaken before analysis.

On the data sheet, circle “Yes” under “Turbidity Sample Collected”. Then record the time of collection.