Addison County River Watch Collaborative

Water Sampling Field Manual for Volunteers

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Updated May 1, 2008

Updated: March, 2018 by Matt Witten, Project Leader

A. CONTACTS

Find your watershed contact person below:

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B. SAMPLING SCHEDULE

2018 sampling will take place on a once-monthly basis from early April through early September:

Wednesday, April 4
Wednesday, May 2
Wednesday, June 6
Wednesday, July 11
Wednesday, August 1
Wednesday, September 5

Sampling will occur during the early morning hours with delivery to the Addison County Regional Planning Commission offices at 14 Seminary Street, Middlebury, VT, no later than: **09:30 AM.**

A 2018 sampling schedule is contained in the field sampling binder for each watershed. This schedule identifies the sample sites in each watershed, as well as the scheduled analyses. Spring events (April, May) differ slightly from the summer events, in that no *E.coli* samples will be collected during the spring events.

FIELD SAMPLING KITS

Your field sampling kit includes the following:

- □ Volunteer Field Notebook, including:
  - 2018 Sampling Schedule
  - 2018 List of Sample Sites and location information
  - 2018 *Water Quality Monitoring Sites by Watershed* map
  - Chart of Bottle Requirements
  - Field Data Sheets
  - Water Sampling Field Manual for Volunteers
  - Spare labels, blank

- □ Cooler with ice packs
- □ Thermometer
- □ Waterproof pens, ball-point pens
- □ Sampling poles (for use as necessary)

C. PREPARING FOR SAMPLING

In the weeks prior to a schedule sampling date, the Project QA Coordinator (Kristen Underwood) will prepare a Pre-Log request and bottle order for the Vermont Agricultural and Environmental Lab and send it to our Project Laboratory Contact (Ethan Swift). The Project Laboratory Contact will check the Pre-Log request / bottle order versus the 2018 Sampling Schedule for completeness / accuracy and will submit the Pre-Log request / bottle order to Alison Farnsworth at the Vermont Agricultural and Environmental Lab (VAEL) prior to sampling. A Collaborative member will pick up the bottle order from the Lab when ready at Hills Building on the UVM campus in Burlington, VT.

Upon receipt of the VAEL-issued Pre-Log and bottle order, the QA Coordinator will check these against the pre-log request and 2018 Sampling Schedule to ensure that correct bottles and labels were received for the scheduled sampling sites, field QC samples, and analyses. Corrections will be identified, where appropriate. If sufficient time is available, replacement labels / bottles will be ordered from the Lab. Otherwise, blank labels will be utilized to fill in for missing or incorrect labels. The QA Coordinator or Project Laboratory Contact will communicate with the lab to ensure that the corrected labels are properly logged in with the bottle order at the close of the sampling event.

In the week or so prior to each scheduled sampling date, volunteers will assemble at the Addison County Regional Planning Commission offices. Tasks at this pre-sampling meeting (also called “bottling party”) will include:

- □ Review available sample results from previous event(s)
- □ Review quality control issues that may have arisen in the field or in the Vermont Agricultural and Environmental Lab during the previous event(s) and discuss corrective action where necessary.
- □ Make necessary updates to the Water Quality Field Manual or Sampling Schedule as necessary.

- □ Distribute sampling bottles, and label the bottles for scheduled sites and analyses in each watershed. To keep in mind while preparing bottles for sampling:

    - Place each label on correct sample bottle type – double check
    - Bunch bottles from the same site together in one or two plastic bags
    - Squeeze turbidity bottles to check if they are brittle. If so, discard.
    - Distribute ice packs evenly among coolers
    - Check each cooler for pen, thermometer, spare bottles, complete binder, etc.

- □ Identify sites for field QC samples and distribute de-ionized water, where appropriate.

D. COLLECTING SAMPLES

1. Preparation:

Before you begin sampling, please complete the following sections on the Field Data Sheet:

- □ Date samples collected
- □ Sampler(s)' names
- □ Previous 3 days weather
- □ Today's weather

Load ice and frozen ice packs into the sample cooler.

If the sampling event includes *E.coli* analysis, please do not collect samples any earlier than 7:00 AM. (If samples are collected any earlier than this, it is very difficult to accomplish delivery to the Lab before the 6-hour holding time for *E.coli*).

2. At each sample site:

Please complete the following sections on the ACRWC Field Data Sheet:

- □ DEC log-in code (this is the number in bold right above the bar code on the sample labels). It should be the same code for all scheduled analyses at the given site – but sometimes this has not been the case, so please review each label carefully).
- □ Sample ID (this is the ACRWC sample station identification, e.g., LCR3.7)
- □ Sample Type (this describes whether the sample is a Field Duplicate [DUP], a Field Blank [BLK], or a regular sample [REG]).
- □ Sample Time (record the same sample time for all the bottles collected at a given site).
- □ Air Temperature (measure in the shade)
- □ Water Temperature (measure at 3 different places at the sample site and report the average)
- □ Water Level
- □ Water Color
- □ % Algal Growth

- □ Note any observations / comments (*e.g.*, might include signs of wildlife activity, cows in stream, dead animals, notable erosion or other physical anomalies in stream bank).

Try to collect samples from the same spot on the river every time, or as close as conditions will safely allow. Please be sure the spot you are collecting from is representative of the river at the site, is in the main current (deepest part of the channel), and is not stagnant water. At many of our sites, this will require wading (with waders or without). Make safety a priority. Use the buddy system. Do not wade into waters that are swiftly moving, and/or greater than 3 feet in depth. An alternative is to use a pole (in combination with a Common Collection Container) that extends the sampling person's reach.

Sampling with a Common Collection Container (when conditions call for it)

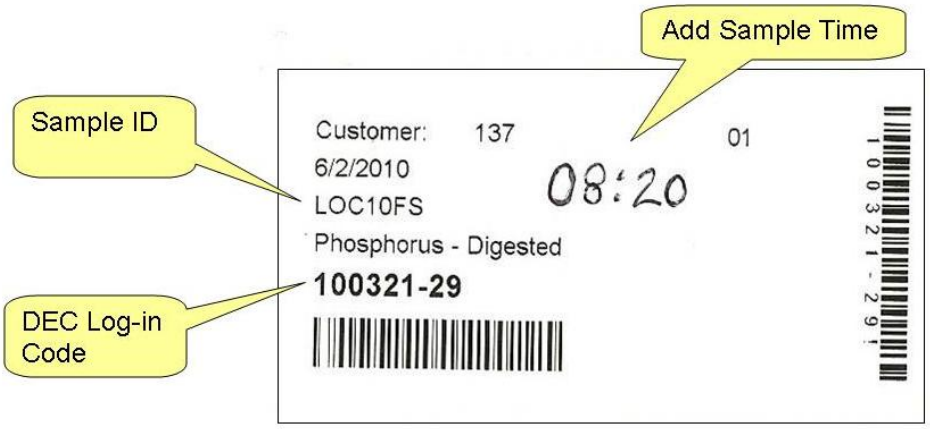
1. At the site, rinse the container three times or more with the water to be sampled.
2. With the container as close to the main current as possible, plunge it into the stream, top down, at least one foot below surface, or halfway between surface and bottom, if water is shallow. Do not disturb bottom sediments.
3. Turn the container into the flow, allow air bubbles to escape and fill the bottle.
4. For those sample bottles that require rinsing (TN, Turbidity, TSS, Alkalinity), use water from the Common Collection Container to rinse the sample bottle, discarding the rinse water each time.
5. Then fill the bottle as instructed in manual. You may need to return to the river several times with the Common Collection Container to fill all bottles.

Filling Field Duplicates:

When filling the Duplicate samples, the water from the Common Collection Container should be divided between the Regular and Field samples. Have both sample bottles for a parameter ready, and split the fill between the bottles. If you are filling a larger bottle (TSS) and need to return to the river, partially fill each of the Regular and Duplicate bottles and then return to the stream with the Collection Container for more water.

The goal is to keep the quality of the Regular and Field Duplicates samples as similar as possible.

Fill in the sample time on each bottle to be collected at the site (this is easier to do when the labels are dry). ***The same sample time should be recorded for all the bottles collected at a given site***, and this sample time must match the sample time recorded on the Field Data Sheet. The Vermont Agricultural and Environmental Lab requests that we use a **ball-point pen** to mark the labels – as water-proof pens (Sharpie- type) can be too thick to read.



Collect water samples following the instructions below:

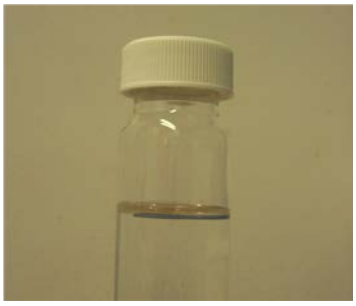
a. Make sure you select the correct bottle(s) labeled for the current site. Make sure your label is correct.
b. Try to disturb as little bottom sediment as possible. Stand facing upstream. You will collect the water from your upstream side in the main current.
c. When ready to sample, remove the cap/lid. Be very careful not to contaminate the bottle by touching any portion of the inside of the lid or bottle.
d. Hold the bottle near its base and plunge it (with its opening downward) below the water surface. Position your sample bottle 8" to 12" beneath the surface or mid-way between the surface and the bottom if shallow. (If you are using the sampling pole, turn the bottle upside down and plunge it into the water facing upstream.)
e. Turn the bottle underwater into the current and away from you. In slow-moving reaches push the bottle away from you in an upstream direction.
f. In all cases, be careful not to collect water that has sediment from bottom disturbance.
g. The bottle should be filled to its appropriate fill line, as detailed in Section 3, specific to each bottle type. Recap the bottle carefully. Do not touch the inside of the bottle or its cap. Make sure that the cap is seated properly and is not cross-threaded because that would lead to sample leakage and the bottle will not be processed by the lab.
h. Place the sample in the iced cooler.
i. Once all the scheduled sample bottles are collected at the site, place a check under the appropriate column(s) for Analysis Requested on the ACRWC Field Data Sheet. This check confirms that you have checked that the sample time has been recorded on each label, and that the DEC Log-in code and Sample ID recorded on the bottle label match the record on the ACRWC Field Data Sheet.

3. Specific Instructions for Each Bottle Type:

Refer also to the Chart of Bottle Requirements in your Volunteer Field Notebook

NO RINSE

E. coli:
Select the labeled clear plastic, sealed, 100ml sample bottle.
Remove the seal around the lid at the sample location.
Fill the bottle exactly to the 100ml line. Do not underfill or overfill.



Total Phosphorus:
Select a labeled 75ml glass sample tube (with white lid).
This label will be marked ***'phosphorus –digested'.***
Fill the tube so that the bottom of the meniscus rests on the black line pre-marked on the outside of the tube by VAEL. Do not underfill or overfill.

Dissolved Phosphorus:
Select a labeled 75ml glass sample tube (with white lid).
This label will be marked ***'phosphorus – filtered/digested'.***
Fill the tube to ***at least ¼ inch above the black line.***

RINSE 3 times with RIVER WATER to be sampled.

Total Nitrogen
Select a labeled 50ml plastic sample tube (with blue cap).
Rinse tube 3 times with river water.
Fill the tube to the 50 ml line. Do not underfill or overfill.
Be careful not to cross-thread the cap.

NOX
Select a labeled 50ml plastic sample tube (with blue cap).
Rinse tube 3 times with river water.
Fill the tube to the 50 ml line. Do not underfill or overfill.
Be careful not to cross-thread the cap.

Turbidity
Select a properly labeled 250ml square opaque plastic sample bottle (with plastic cap).
Rinse bottle 3 times with river water.
Fill the bottle, allowing a small amount of headroom. Do not overfill.

Total Suspended Solids
Select a labeled 1 liter round opaque plastic sample bottle (with plastic cap).
Rinse bottle 3 times with river water.
Fill the bottle, allowing a small amount of headroom. Do not overfill.

Alkalinity
Select a properly labeled 250ml square opaque plastic sample bottle (with plastic cap).
Rinse bottle 3 times with river water.
Fill the bottle, allowing a small amount of headroom. Do not overfill.

4. Quality Control Samples (Field Blanks, Duplicates and Spikes):

QC Sample collection sites and parameters will vary throughout the sampling season therefore samplers must pay close attention to their sampling instructions and sample labels.

The ACRWC Project Leader or Project QA Coordinator will inform you if your team is collecting QC samples and will provide you with the lab-supplied Deionized Water that you will use for blanks.

a. Field Blank

A Field Blank is generated by processing laboratory-supplied de-ionized water through the sampling and analysis procedure. The Field Blank checks for contamination introduced from the laboratory-supplied sample container(s) or from field sources (*e.g.*, sample handling, transport). Field Blanks are processed for all the same analyses that are scheduled for the primary sample at the assigned site.

Field blank samples will be designated on the sample labels at the scheduled Site ID followed by "BLK" (e.g., LCR19.5 BLK). Make sure that the site # is the same as the site you are currently sampling**.**

Fill each pre-labeled sample container as per the instructions above, **but use the de-ionized water provided instead of river water.**

Record the sample time on the labels of the Field Blank sample bottles.
Place Field Blank bottles in the iced cooler.

Complete a sample record on the ACRWC Field Data Sheet, filling in the appropriate DEC log-in code, Sample ID, and Sample Time.

Place a check under the appropriate column(s) for Analysis Requested on the ACRWC Field Data Sheet. This check confirms that you have checked that the sample time has been recorded on each label, and that the DEC Log-in code and Sample ID recorded on the bottle label match the record on the ACRWC Field Data Sheet.

b. Field Duplicate:

The Field Duplicate is a replicated sample collected at the same point in time and space as the primary sample so as to be considered identical. The Field Duplicate is used to assess precision of the total method, including sampling, analysis, and site heterogeneity. Field Duplicates are processed for all the same analyses that are scheduled for the primary sample at the assigned site.

Field duplicate samples will be designated on the sample labels at the scheduled Site ID followed by "DUP" (e.g., LCR19.5 DUP). Usually, the Field Duplicate is collected at the same site as the Field Blank.

Fill each bottle with river water per the instructions above. The Field Duplicate bottles should be collected at the same time and in the same manner as the primary sample bottles. If you are using a common collection vessel (either attached to a pole sampler or hand-held during a wading sample collection), rinse the collection vessel three times in the water to be

sampled. Fill the collection vessel, and decant river water into the primary-sample and Field Duplicate bottles equally from the vessel. Fill to the appropriate line, as described in Section 3, specific to each analysis type. Replace the bottle caps.

Record the sample time on the labels of the Field Duplicate sample bottles. These bottles will have the same sample time as was recorded for the primary sample collected at the site. Place Field Duplicate bottles in the iced cooler.

Complete a sample record on the ACRWC Field Data Sheet, filling in the appropriate DEC log-in code, Sample ID, and Sample Time.

Place a check under the appropriate column(s) for Analysis Requested on the ACRWC Field Data Sheet. This check confirms that you have checked that the sample time has been recorded on each label, and that the DEC Log-in code and Sample ID recorded on the bottle label match the record on the ACRWC Field Data Sheet.

c. Matrix Spike:

Matrix Spike samples are collected only for analysis of Total Phosphorus and Dissolved Phosphorus (if scheduled). A matrix spike is a second sample bottle, filled from the same sample collection as the primary sample. For grab samples, there is no functional difference between a Field Duplicate and a Matrix Spike. The matrix spike allows the laboratory to perform analytical replication that separates variability in sampling from variability in analytical processing.

The Project Leader or QA Coordinator will identify sites for collection of a Matrix Spike. Generally, these are collected at the same location as the Field Duplicate.

Matrix spike vials are supplied by Vermont Agricultural and Environmental Laboratory with the bottle order for the event. They consist of one 75 ml glass tube with white cap for each analysis (Total Phosphorus and Dissolved Phosphorus) – pre-labeled as a matrix spike.

Mark on the Matrix Spike label:
where it says Location: the Site ID followed by the suffix "SPK" (e.g., LCR19.5 SPK).
where it says Lab Sample ID#: the DEC Log-in number for the Field Duplicate.

The Matrix Spike is collected in the same manner as described above for the Field Duplicate.

Record the sample time on the labels of the Matrix Spike sample bottles. These bottles will have the same sample time as was recorded for the primary sample (and Field Duplicate) collected at the site. Place Matrix Spike bottles in the iced cooler.

Complete a sample record on the ACRWC Field Data Sheet, filling in the appropriate DEC log-in code, Sample ID, and Sample Time.

Place a check under the appropriate column(s) for Analysis Requested on the ACRWC Field Data Sheet (Total Phosphorus and Dissolved Phosphorus only). This check confirms that you have checked that the sample time has been recorded on each label, and that the DEC

Log-in code and Sample ID recorded on the bottle label match the record on the ACRWC Field Data Sheet.

5. In Case of Bottle Loss, Breakage, or Contamination

If a sample bottle is inadvertently broken, lost downstream, or contaminated during handling, do not use it for sample collection. Use a new bottle instead (where possible, a set of spare bottles will be issued in your sample kits). Use provided blank labels to affix to the replacement bottle and mark it with the correct Sample Site ID, DEC Log-in Code, Sample Date, Sample Time and requested Analysis. Make a note of your actions in the comments section of the ACRWC Field Data Sheet.

If a blank label is not available, mark the sample info directly on the bottle using a Sharpie marker. The Project Leader can provide labels upon delivery to RPC offices.

E. DROPPING OFF SAMPLES AND SAMPLING MATERIALS:

Samples must be delivered to the Addison County Regional Planning Commission offices no earlier than 8:00 AM and no later than **09:30 AM** on the day of sampling. Do not leave samples unattended. The Project Leader (or designated alternate) will check in your samples for completed sample labels, and will sign off on the chain of custody section in the ACRWC Field Data Sheet. Original field data sheets will be retained in the master project binder at RPC offices. Field samplers may make copies of these field data sheets to take with them.

The QA Coordinator will enter sample times from the Field Data Sheets to the VAEL Pre-Log sheet. A check will also be done against the original 2017 Sampling Schedule to ensure that all scheduled samples were collected and delivered to RPC offices. If problems were encountered in the field, the volunteers will help to document the issues encountered.

Sample bottles (and ice/ ice packs) will be consolidated from volunteer's coolers to one (or more) coolers for transport to Vermont Agricultural and Environmental Lab (VAEL).

The Project Laboratory Contact or QA Coordinator (the "Lab Runner") will transport the samples to VAEL, and will stay to log-in the samples and perform lab filtration for the Dissolved Phosphorus samples, where appropriate. If the sampling event includes *E.coli* samples, delivery to the VAEL must occur by 12:00 Noon on the sample date. The Lab Runner must fill out the **Lab Runner Log** to document transport times and any incidents occurring during transport and/or delivery and filtering.

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