

Standard Operating Procedure for:

Water Sample Collection
(1040R01 Water Sampling.doc)

Missouri State University

and

Ozarks Environmental and Water
Resources Institute (OEWRI)

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1 Identification of the method

Water sample collection

2 Scope of the method

This standard operating procedure provides Missouri State University (MSU) field and laboratory personnel with guidance on the procedure for collecting, preserving, and transporting water samples. Information is also provided for the proper completion of sample collection forms.

3 Summary of method

Water samples are collected in bottles appropriate for each analyte. Sampling personnel should be aware that collecting water samples can be hazardous and that following these procedures should minimize personal risks. Sample bottles are dipped into stream flow either by hand or at the end of a sampling pole. A preservative is added to the bottle if needed; the bottle is sealed and placed into a cooler with ice. Information about the sample (for example, collection time, temperature, preservative, etc.) is recorded on the sample collection form and bottle label.

4 Definitions

4.1 Chain of Custody: used to describe the written record of the collection, possession and handling of samples. Unless the analytical results are expected to be challenged legally, a chain of custody is not required. Sample collection information and forms are adequate.

5 Health and safety

- 5.1 When wading in streams where water depths may be 1 meter deep or more, wear a life preserver and/or remove hip boots or chest waders. Currents can force wading field workers into deep water and water-filled boots can make swimming difficult.
- 5.2 When walking through densely vegetated areas along streams, be sure to look for and avoid toxic plants like poison ivy. Be sure to wear appropriate insect repellent and protective clothing for protection from mosquitoes, chiggers, and ticks. In addition, probe areas in your path with a walking stick to warn and disperse poisonous snakes like the cotton mouth and copperhead which may inhabit riparian areas.
- 5.3 Field staff should protect themselves from water borne illness by wearing disposable gloves, and avoid touching eyes, nose and mouth. Be sure to clean up with bacteria disinfectant soap and water after wading in streams. This is particularly important for streams that drain livestock areas, sewage treatment plant effluents, and other obvious pollution sources. Under no circumstances should you drink the water from any stream.
- 5.4 Concentrated sulfuric acid is highly corrosive. Use protective gloves during handling. Review the MSDS for sulfuric acid for additional information and safety concerns.

6 Personnel qualifications

Water samples will be collected by Missouri State University (MSU) field and laboratory personnel who have received appropriate training from experienced personnel, prior coursework, and field experience regarding the collection of grab samples, and who are familiar with all of MSU's sample handling and labeling procedures and appropriate SOPs.

7 Equipment and supplies

- 7.1 Field Notebook, Pen, and Permanent Marker: for recording sample site information and to complete the sample bottle labels.
- 7.2 Global Positioning System (GPS): to locate sample sites
- 7.3 Cooler with ice and bottle rack: for storage and transport of samples from the field to the lab.
- 7.4 Concentrated Sulfuric Acid (H_2SO_4) in dropper bottle: for preservation of nutrient samples. (Caution: highly corrosive. Handle with gloves)
- 7.5 Concentrated Nitric Acid (HNO_3): for preservation of metals samples. (Caution: highly corrosive. Handle with gloves)
- 7.6 Protective Gloves: for protection against chemicals and from water borne contaminants.
- 7.7 pH Meter (use the water sample pH meter, not the sediment pH meters): to test the sample for proper pH after preservation (samples must have a pH of < 2).
- 7.8 Sample containers: appropriate for the analytes to be tested for
- 7.9 US DH-48 Depth-integrating Suspended Sediment Sampler: to collect depth integrated samples.
- 7.10 Sampling pole: used to extend the reach from shore by 5 to 10 feet depending on the length of the pole.

8 Procedure

- 8.1 Every sample container must have a sample label (see below for an example). Complete the label using indelible ink before placing the bottle in the stream (i.e., it is easier to write on a dry label than a wet one).

Date: _____ **Time:** _____
Site: _____ **Project:** _____
Analyze for: _____
Collected by: _____

Missouri State University
Ozarks Environmental and Water Resources Institute

- 8.2 For each collection day, the date, stream flow and precipitation within the last 24 hours will be recorded in the field notebook.
- 8.3 For each sample record the site ID, sample type, matrix, container type, preservative, time collected and the sample collector's initials on the sample collection form (see 1030R01 Chain of Custody.doc for explanation of how to complete the sample collection and chain of custody form).
- 8.4 Do not disturb the water upstream of the sampling location. If this does happen,

then allow sufficient time and flow to pass for stream to clear itself before collecting a sample.

- 8.5 Collect representative samples from flowing water, mid-stream and where water constricts such as at riffles.
- 8.6 Rinse the sample container with water from the sampling site. Discard the rinsate downstream. However, some sample containers (e.g., bottles for bacterial analysis) should not be rinsed because they contain a preservative or neutralizing chemical that should not be rinsed out.
- 8.7 In shallow streams (< 0.2 m), samples are collected in the sample bottle by dipping the bottle below the water surface. Fill the bottle to just below the neck. A sampling pole can be used to sample approximately 5 - 10 feet from the shoreline by placing a bottle into the bottle holder of the pole.
- 8.8 In deeper streams (> 0.2 m and < 0.5 m) a depth integrated sample can be collected.
 - a. Dip the bottle into the water with the opening pointed down to exclude water.
 - b. Slowly, begin to turn the opening up while moving the bottle up through the water column.
 - c. The bottle should be almost full when the bottle is removed from the stream.
 - d. If the bottle is completely full then it is probable that the bottle was full before reaching the top of the water column. In this case, re-collect the sample using a faster speed through the column
- 8.9 Composite sampling across a stream
 - a. Collect integrated samples across a stream
 - b. Use one bottle and collect small portions for each section of the stream width.
 - c. Or, fill one bottle for each stream width section.
- 8.10 When the water is > 0.5 m, use an Integrated sampling device
 - a. US DH-48 Depth-Integrating Suspended Sediment Sampler
 - b. See <http://fisp.wes.army.mil/Instructions%20US%20DH-48%20001010.PDF> for the description of this device and the instructions for its use.
- 8.11 Add chemical preservatives immediately after collection. Generally 1.0 ml (45 drops) of preservative is used to acidify surface water samples collected in the Ozarks. Check the pH of samples using the water sample pH meter to ensure that the sample pH is ≤ 2 units. Rinse the pH meter with DI water after every use and wipe with a Chem Wipe to dry.
- 8.12 Bottles are sealed and placed on ice in a cooler for transport to the laboratory. The samples are placed in a refrigerator in the laboratory. The samples will be kept in the possession of Missouri State University personnel who both collect and analyze the samples.
- 8.13 Determine the maximum holding time for each analyte, but analysis should begin

as soon as possible upon delivery at the laboratory.

- 8.14 The collection sheets should be stored in a file dedicated to the project for which samples are collected.

9 Computer hardware and software

9.1 Microsoft Word: this document is prepared using Word.

9.2 The Word document file name for this SOP is: 1040R01 Water Sampling.doc

10 References

None

11 Tables, diagrams and flowcharts

There are no tables, diagrams or flowcharts for this method