Rhode Island Department of Environmental Management
Office of Water Resources
Standard Operating Procedure (SOP) Review Page

SOP No.	SOP Name	Review Date	What changes, if any?	Reviewed By	Revision/ Renewal Date
WR-W 32	SOP for Bottle-Direct water Samples Lakes, Ponds, and Reservoirs	5/28/21	NONE	Brian Zalewsky	5/28/21

APPROVALS: I certify that the SOP has been reviewed, revised (if necessary), and verify that the SOP accurately reflects the current needs of the program:

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Standard Operating Procedure for Bottle-Direct Water Samples Lakes, Ponds, and Reservoirs

SOP-WR-W-32

APPROVALS:

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Title: Standard Operating Procedure for Bottle-direct Water Samples – Lakes, Ponds, and Reservoirs
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Standard Operating Procedure for Bottle-direct Water Samples
Lakes, Ponds, and Reservoirs

1. APPLICABILITY

This SOP applies to all Office of Water Resources (OWR) staff involved in collecting bottle-direct water samples in lakes, ponds, and reservoirs. Exemption from the use of this SOP for project work shall be allowed for reasons of inapplicability determined by management discretion.

2. PURPOSE

This SOP establishes a standardized method for performing field collections of bottle-direct water samples in lakes, ponds, and reservoirs. It sets a consistent protocol to ensure the quality of OWR's data collection—resulting in improved uniformity, reproducibility, verifiability, and defensibility of the data, as well as increased program credibility.

3. DEFINITIONS

3.1 RIDEM – Rhode Island Department of Environmental Management

3.2 OWR – RIDEM Office of Water Resources

3.3 SOP – Standard Operating Procedures

3.4 Bottle-direct – A procedure to collect water samples without a sampling device.

3.5 QA – Quality Assurance refers to a systematic process to ensure production of valuable, accurate, reliable, reproducible and defensible environmental data.

3.6 QC – Quality Control refers to the activities performed to affirm production of valuable, accurate, reliable, reproducible and defensible environmental data.

3.7 QI – Quality Improvement refers to any act or process performed to enhance the value, accuracy, reliability, reproducibility or defensibility of environmental data collected by RIDEM OWR.

4. RESPONSIBILITIES

4.1 TRAINING

Any RIDEM/OWR personnel collecting bottle-direct water samples for a RIDEM project or program should have completed RIDEM's Quality System Awareness Training Program with appropriate documentation from the Quality Assurance

Manager. This training ensures the field analyst recognizes the importance of proper data collection and management and he/she comprehends the significance of the environmental decisions that may be made with the data. It is suggested that field analysts have also completed the USEPA Water Quality Standards Academy Basic Course and Supplemental Topic Modules online, but does not require any additional special training or certification.

To properly collect bottle-direct water samples, the field analyst must be familiar with and comply with the data collection techniques stated in this SOP. The field analyst is required to read and understand this SOP. The field analyst should complete and submit any required training forms and/or field assessments for project and/or program QAPPs to document proficiency with this procedure. Any field analyst not familiar with the collection of bottle-direct water samples from a lake, pond, or reservoir should be assisted by OWR staff who are accustomed to performing the procedure.

4.2 RESPONSIBILITIES OF FIELD ANALYST

The field analyst is responsible for checking the required equipment (correct bottle(s) or sampling container(s)) in the Sampling Center at the beginning of the sampling event before taking measurements in the field. The field analyst is responsible for ensuring that all supplementary equipment (bottles, canoe or kayak, etc.) are present and in working condition. The field analyst is also responsible for using best professional judgment to determine if site conditions are safe for performing the procedure. The field analyst is accountable for employing proper measurement procedures and data recording in accordance with this SOP.

4.3 RESPONSIBILITIES OF PROJECT OR PROGRAM MANAGER

The project or program manager is responsible for providing the materials, resources, and/or guidance necessary to perform the bottle-direct water sample collections in accordance with this SOP. The project manager is responsible for ensuring that the field analyst collects bottle-direct water samples correctly in accordance with this SOP and that any additional, project-specific requirements are communicated to the project team. The project manager is responsible for ensuring the supplementary equipment is maintained in proper operating condition annually. The project manager will determine and communicate with field analysts what procedures and order of procedures are to be accomplished during each sampling event to a sampling location. Further, the project manager shall ensure annual renewal and periodic revisions to this SOP as necessary to reflect current needs and standards as well as renew this SOP every five years.

5. GUIDELINES AND PROCEDURES

5.1 PROPER COLLECTION OF BOTTLE-DIRECT WATER SAMPLES

5.1.1 REQUIRED MATERIALS

The following materials are necessary for this procedure:

- Datasheet or field notebook printed on waterproof paper (Figure 1, paper similar to Grainger Item Number 3XFR7)
- Clipboard
- Pencil or Rite in the Rain Pen (similar to Forestry Suppliers Item Number 49237)
- Bottles or sample containers (number and size will depend on project requirements)
- Boat, canoe or kayak
- Paddles and motor
- Anchors
- Lifejackets
- Depth finder

5.1.2 COLLECTING BOTTLE-DIRECT WATER SAMPLES IN THE FIELD

For most purposes, the procedure for bottle-direct water sample collection is used specifically for in situ water sample collections taken directly in the field, in lakes, ponds, and reservoirs. This method does specifically require bottles or sample containers, but it is not appropriate for bottles or sample containers that contain preservative. If the preservative is added after collection, this procedure may be used when collecting analytes that require preservative.

5.2 FIELD COLLECTION PROCEDURES

5.2.1 DETERMINE FIELD PROCEDURE SCHEDULE

Prior to departure, the project manager will communicate with the field analysts what procedures should be accomplished for each sampling trip to the sampling location, the order of the field procedures, and whether quality control procedures should be completed. Prior to performing this analysis, the field analyst should ensure the water sample is collected at the appropriate time of day and in the correct order. This procedure may disrupt fish and microscopic organisms, such as phytoplankton and zooplankton, which can interfere with other field procedures and sample collections in lakes, ponds, and reservoirs. Bottle-direct water samples

should be collected after these samples. However, bottle-direct water sample collections should be taken before any sampling procedure or activity that may disturb bottom sediments to avoid increasing turbidity at the location. The field analyst should note any disturbance to the bottom sediment in the Comment/Notes section of the field datasheet (Figure 1) or appropriate field notebook.

5.2.2 POSITION THE BOAT AT THE DEEPEST POINT OR DESIRED DEPTH

If a bathymetric map is available, the field analyst should use the map and distinguishing land characteristics (i.e. outfall structures, points, inlets, boat launch) to find the general location of the deepest spot or desired depth in the lake, pond, or reservoir. The field analyst should verify the location by confirming several depth locations with the depth finder around the general location of the deepest spot or desired depth. Once the deepest location or desired depth is established, the field analyst should carefully lower the anchor so that bottom sediment is not disturbed into the water column. The field analyst should record the depth of the deepest location or desired depth to the nearest tenth of a meter on the field datasheet (Figure 1) or appropriate field notebook. For monitoring section sampling events, the field analyst should fill out the information at the top of the field datasheet (Figure 1) prior to collection of water samples.

5.2.3 TAKING THE BOTTLE-DIRECT WATER SAMPLE

If a water column profile is being collected, the bottle-direct water sample should be collected on the same side as the water column. If a water column is not being collected, then either side of the boat can be used. No homogenization, compositing, splitting, or filtering of the water sample is required.

- The field analyst should confirm which side of the boat the water column profile was collected, if performed.
- The field analyst should confirm that the bottle or sampling container is correctly labeled for the site being sampled.
- The field analyst should uncap the bottle or sampling container.
- The field analyst should plunge the bottle or sampling container into the water upside down as far as possible.
- In one motion, turn the bottle or sampling container up and scoop forward bringing the full bottle to the surface.
- Cap the bottle or sampling container and place it in a cooler filled with ice.

6. QUALITY CONTROL

6.1 QUALITY CONTROL

Quality control will be assessed by duplicates collected at 15-20% of monitoring locations.

6.2 QUALITY ASSURANCE PLANNING CONSIDERATIONS

The end use of the data will determine the quality assurance requirements that are necessary to produce data of acceptable quality. Unless specified otherwise in a site or project-specific work plan, Quality Assurance Project Plan (QAPP), Quality Assurance Program Plan (QAPP) or laboratory Quality Assurance Manual (QAM), all data collected following the protocols set forth in this document will be collected in accordance with the minimum QAQC requirements of Section 6.1. Further quality assurance requirements will be defined in project specific work plans and may include duplicate or replicate measurements or confirmatory analyses.

7. REFERENCES

Green, L.T., E.M. Herron, and A.J. Gold. 2010. *URI Watershed Watch Revised Lake and Pond Monitoring Manual*. College of the Environmental and Life Sciences, University of Rhode Island. Contribution #5047.

RIDEM. *Field Sampling with Bottles not Containing Preservatives*. Office of Water Resources, Rhode Island Department of Environmental Management. WR-W-22. http://www.dem.ri.gov/pubs/sops/wrw22.pdf

Figure 1. Lake Datasheet for Monitoring Section Sampling Events

Lake Sampling Datasheet

Lake Name: _____		**Town:**	_____
Date: _____	**Military Time:** _____	**Collectors:**	_____
Meter # _____			
Max Depth: _____	m		
Weather: (Circle one)	**Clear** **Raining**	**Partly Cloudy** **Windy**	**Overcast** **Sunny**
Air Temperature: _____	°C		
Comments/Notes:			

Secchi Depth #1	_____m		
Secchi Depth #2	_____m		
QC Range (5%)	_____m	**Accepted?**	_____
Secchi Depth #3	_____m	**Action?**	_____
Secchi Depth #1 redo	_____m		
Secchi Depth #2 redo	_____m		

			QC Measurement (20% of sites)
Water Column Readings (reading taken at 1m)	**Temperature**	_____°C	_____°C
	pH	_____	_____
	Specific Conductivity	_____µS/cm	_____µS/cm
	Dissolved Oxygen	_____mg/L	_____mg/L
		_____%	_____%