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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 discrete depth direct water samples in lakes, ponds, and reservoirs using a Van Dorn Sampler. 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 discrete depth water samples in lakes, ponds, and reservoirs using a Van Dorn Sampler. 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 QA – Quality Assurance refers to a systematic process to ensure production of valuable, accurate, reliable, reproducible and defensible environmental data.

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

3.6 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 use a Van Dorn Sampler, 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 Van Dorn 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 Van Dorn Sampler 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 utilize a Van Dorn Sampler in accordance with this SOP. The project manager is responsible for ensuring that the field analyst collects 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 WATER SAMPLE USING VAN DORN SAMPLER

5.1.1 REQUIRED MATERIALS

The following materials are necessary for this procedure:

- Depth finder

- Van Dorn Sampler
- Datasheet or field notebook printed on waterproof paper
- 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

5.1.2 USING A VAN DORN SAMPLER IN THE FIELD

Van Dorn Samplers (Figure 1) are intended for shallow or deep waters, The one used by RIDEM staff is called “horizontal” because it descends, parallel to the bottom. It is ideal for sampling at the thermocline, at other stratification levels, or just above the bottom sediments.

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. Van Dorn water samples should be collected after these samples. However, Van Dorn 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 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 USING THE VAN DORN SAMPLER

When discrete samples are desired from a specific depth a Van Dorn sampler will be used according to the following instructions.

- Open the Van Dorn water sampler by pulling the elastic bands and lids back and secure the hooks.
- Make sure the mechanism is locked so that it will be released by the releasers weight.
- Make sure the drain valve is closed.
- Attach the free end of the messenger line to the boat.
- Rinse the open sampler by immersing it in the water column.
- Lower the sampler to the desired depth. Avoid bottom disturbance.
- When the Van Dorn sampler is at the required depth, send down the messenger, closing the sampling device.
- Retrieve the sampler and set on a clean flat surface in a horizontal position.
- Discharge the first 10-20 ml to clear any potential contamination on the valve.
- Transfer the sample to the appropriate sample container. The amount of water flowing through the tubing can be adjusted by adjusting the air valve.
- Cap the bottle or sampling container and place it in a cooler filled with ice

Figure 1. Van Dorn Sampler (Horizontal and Vertical Sampler)

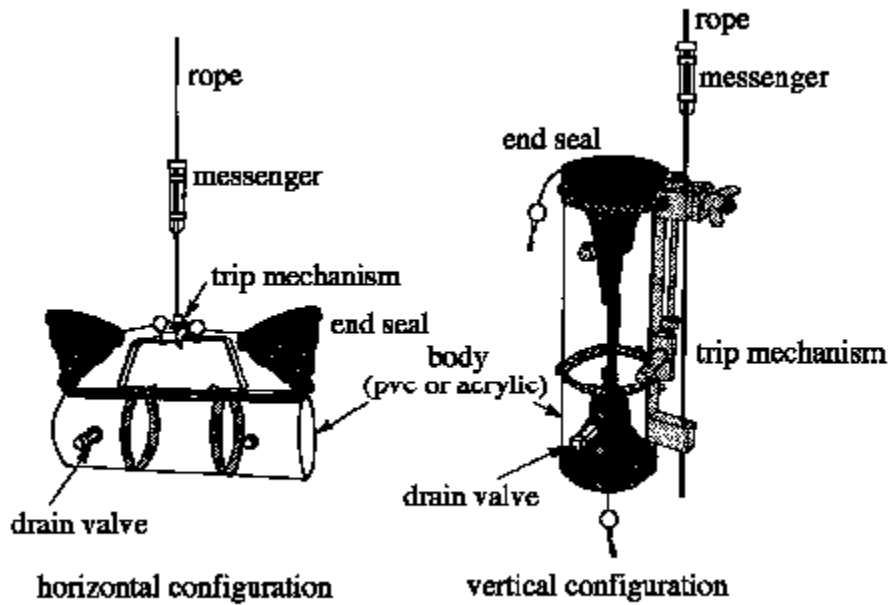


Figure 1. Van Dorn sampler