

Surface Water Sampling Overview:

The following standard operating procedure (SOP) is to be used to collect representative surface water samples consistently in accordance with DEQ/EPA methodology. Each collection event must be performed consistently so that samples are true representation and are not cross contaminated nor altered from improper handling. When using a watercraft, take samples near the bow, away and upwind from any gasoline outboard engine. Orient watercraft so that bow is positioned in either the upwind or upstream direction. When wading, collect samples upstream from the body. Avoid disturbing sediments in immediate area of sample collection. Collect water samples prior to taking sediment samples when obtaining both from the same area (sample site). Collect surface water samples starting downstream towards the upstream direction.

Make sure samples are representative of the selected sampling locations, for example, when attempting to characterize a water body that may be stratified or heterogeneous. Unless dictated by permit, program or order, sampling at or near natural or unnatural structures (e.g., dams, stumps, weirs or bridges) may not provide representative data because of unnatural flow patterns.

Use sampling equipment constructed of materials consistent with the analytes of interest. Select equipment based on the analytes of interest, the specific equipment used and the available equipment. Use a clean (preferably unused) residue free container of appropriate composition for nutrient sampling. Use a sterile container of appropriate composition for microbiological parameters.

For information on sample container size and construction, preservation and holding time requirements, refer to Table 1 below for selection of appropriate equipment.

PROCEDURE:

Use the following protocols when collecting surface water samples:

Direct Surface Grab Technique Sampling:

- The use of unpreserved sample containers is encouraged since the same container can be submitted for laboratory analysis after appropriate preservation. Use an unpreserved sample container to collect the sample.
- Slowly remove the container cap and slowly submerge the container, opening first, into the water entrapping the air in the container.
- Collect surface grab samples within the top 12 inches of the water column.
- Avoid skimming the surface of the water during collection unless specifically required by the sampling plan.
- Very shallow water bodies may require careful techniques of sample collection to avoid disturbing sediments.
- Invert the bottle at the depth desired so the opening is rotated upright and pointing towards the direction of water flow (if present).
- Allow water to run slowly into the container until filled.
- Return the filled container quickly to the surface keeping container vertical.
- Pour out a small volume of sample away from and downstream of the sampling location. This procedure allows for addition of preservatives and some head space for sample mixing and expansion. Do not use this step for volatile organics or other analytes where headspace is not allowed in the sample container.
- Add preservatives, if required, securely cap container, label with permanent marker or ink and complete field notes.
- If preservatives have been added, invert the container several times to ensure sufficient mixing of sample and preservatives.
- Check preservation of the sample and adjust pH with additional preservative, if necessary. **Do not over acidify the sample.**

Depth Grab Technique Sampling:

- Examples of equipment that may be used for depth grab sampling include Kemmerer, Niskin, Van Dorn and similar samplers.
- Measure the water column to determine maximum depth and sampling depth prior to lowering the sampling device.
- Mark the line attached to the sampler with depth increments so that the sampling depth can be accurately recorded.
- Lower the sampler slowly to the appropriate sampling depth, taking care not to disturb the sediments.
- At the desired depth, send the messenger weight down to trip the closure mechanism.
- Retrieve the sampler slowly.
- Rinse the sampling device with ample amounts of site water prior to collecting the first sample.
- Discard the initial discharge to flush the discharge tube before dispensing into the sample container.
- Discard rinsate away from and downstream of the sampling location.
- Fill the individual sample bottles via the discharge tube.

Sample Preservation:

If the only analyte of interest is Total Phosphorus and/or Ammonia, and the project is unrelated to an NPDES permit, the sample must be chemically preserved with sulfuric acid (H₂SO₄) but it need not be cooled to 4°C with wet ice. **Do not over acidify the sample.** Sodium thiosulfate is to be added only to chlorinated drinking water.

Table 1: Holding Times and Preservation of Liquid Samples (Standard Methods & EPA)

<u>Parameter</u>	<u>Preservative</u>	<u>Holding Time</u>	<u>Sample Size</u> ¹
			(minimum amount required for analysis, consider more than double the volume for duplicate or re-testing purposes)
Alkalinity	4°C	14 Days	50mL
Ortho Phosphate	4°C	48 Hours	50mL
Total Phosphorus	4°C & H ₂ SO ₄ to pH <2	28 Days	50mL
Nitrate Nitrogen	4°C	48 Hours	50mL
Nitrite Nitrogen	4°C	48 Hours	50mL
Ammonia	4°C & H ₂ SO ₄ to pH <2	28 Days	50mL
TSS	4°C	7 Days	100mL
Fecal Coliform	4°C (& Na ₂ S ₂ O ₃)*	6 Hours	100mL
Chlorophyll a	See below**	See below**	100mL (Opaque)
BOD	4°C	48 Hours	100mL
TKN	4°C & H ₂ SO ₄ to pH <2	28 Days	100mL
pH	NA	15 Min (In-situ)	NA
Dissolved O ₂	NA	15 Min (In-situ)	NA
Metals (except Hg)	HNO ₃ pH <2	6 Months	100mL
Mercury	HNO ₃ pH <2	28 Days	100mL
Caffeine	4°C	7 Days	100mL (Glass only)
Chloride	4°C	28 Days	100ml
Conductivity	4°C	28 Days	100mL
Hardness	HNO ₃ pH <2	6 Months	100mL
Turbidity	4°C	48 Hours	100mL
Heterotrophic Bacteria	4°C (& Na ₂ S ₂ O ₃)*	24 Hours	1Liter/KG

¹High Density Poly Ethylene or Glass with minimum volume required for analysis listed

*For Chlorinated water only

**Sample must be chilled to 4°C within 15 minutes post collection, then filtered with 47mm glass fiber filter within 48 hours, then filters must be frozen in 90% acetone then, can be held for 28 days.

References:

Environmental Protection Agency 40 CFR Part 136, Guidelines Establishing Test Procedures for the Analysis of Pollutants; Analytical Methods for Biological Pollutants in Wastewater and Sewage; Final Rule

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