STANDARD OPERATING PROCEDURE FOR COLLECTION OF WATER CHEMISTRY SAMPLES IN STREAMS

WATER QUALITY

State of Utah
Department of Environmental Quality
Division of Water Quality

Revision 2.1
Effective May 2020

Foreword

Utah Division of Water Quality (DWQ) Standard Operating Procedures (SOPs) are adapted from published methods or developed by in-house technical experts. This document is intended primarily for internal DWQ use. This SOP should not replace any official published methods.

Any reference within this document to specific equipment, manufacturers, or supplies is only for descriptive purposes and does not constitute an endorsement of a product or service by DWQ. Additionally, any distribution of this SOP does not constitute an endorsement of a procedure or method.

Although DWQ will follow this SOP in most instances, there may be instances in which DWQ will use an alternative methodology, procedure, or process.

The methodology detailed below is the protocol followed by DWQ's monitoring staff and verified by DWQ's Quality Assurance officer.

Signature: Benjamin R. Brown
Benjamin R. Brown (Aug 31, 2020 13:15 MDT)

08/31/2020

Email: brbrown@utah.gov

Benjamin R. Brown
Monitoring Section Manager

Date

Signature: Toby D. Hooker
Toby D. Hooker (Aug 31, 2020 13:40 MDT)

08/31/2020

Email: tobyhooker@utah.gov

Toby Hooker
Quality Assurance Officer

Date

Revision page

Date	Revision	Summary of Changes	Sections	Other Comments
6/1/12	1	N/A	N/A	Put into a new standardized format, began document control/revision tracking.
5/1/14	0	Changed revision number, minor formatting	N/A	First version should have been revision 0.
1/22/20	2.0	Updated language, grammar, and structure	All	Clarified and revised sentence structure and grammar throughout the entire document.
3/19/20	2.1	Updated Table 1	9	Revised and updated information concerning sample preservation and holding times for UPHL.

Table of Contents

1.0 SCOPE AND APPLICABILITY

This document presents the Utah Division of Water Quality's (DWQ) Standard Operating Procedure (SOP) for performing routine surface water sample collection for chemical analyses. This SOP does not cover depth-integrated lake/reservoir sampling, or processing of samples for chlorophyll-a analysis. Refer to DWQ's *SOP for Collection of Lake Water Sampling and Data Collection* and DWQ's *SOP for the Collection and Filtering of Water Column and Benthic Chlorophyll-a Samples* for these procedures.

This SOP focuses on grab samples used to determine the concentration of analytical parameters at a point in time for a given waterbody. This SOP does not cover flow-proportional composite sample collection. This method assumes that sampling targets (pollutants) are uniformly distributed in the water column and does not address depth-integrated sampling (and accepts the error associated with this assumption). This SOP applies to all DWQ field staff, DWQ cooperators, and volunteer monitors trained on this SOP. This method, although detailed for stream and river sampling, is suitable for sampling impounded or fringe wetlands and their outlets or inflows, lake grab samples, and discharges, ponds, lagoons, or other surface water sampling points at regulated facilities.

Routine water column sample collections performed by DWQ should be accompanied by measurements of flow (if sampling a flowing water body) and multi-parameter sonde (in situ) conditions. Consult DWQ's streamflow and multi-parameter sonde SOPs for further information.

2.0 SUMMARY OF METHOD

Grab samples may be collected using the following methods:

Preferred Method:

- Collection from the thalweg by wading into the flowing waterbody and direct dipping of sample bottle or HDPE transfer bottle

Exceptions to Preferred Method:

Nonwadeable streams: *For all cases target the thalweg (preferred) or downstream moving water*

1. If site is near a bridge use a plastic HDPE bucket
2. If unable to sample from a bridge collect from the bank with a HDPE dip sampler

Other water conditions:

- If sampling from a facility discharge point, collect by direct dipping of sample bottles. If unable to collect water directly from the source, bucket and dipper techniques can be used.

- If sampling a grab sample from a lake or wetland, collect by direct dipping of sample bottles. If unable to collect water directly from the source, bucket and dipper techniques can be used.
- Any other conditions see the project specific Sampling and Analysis Plan (SAP) or SOP.

If samples are to be analyzed for dissolved constituents, field filtering (using water collected in the HDPE transfer bottle) of the raw sample is performed (See **Section 9.3**). Samples should either be stored on ice or in a fridge to ensure that the samples stay below 4°C.

Most often, iced samples are delivered with appropriate paperwork to the State of Utah's Public Health Laboratories, Chemical and Environmental Services Bureau (hereafter referred to as the State Lab). Water chemistry samples may also be submitted to other laboratories, upon request and as specified in an applicable project-specific SAP.

3.0 DEFINITIONS

DI Water: Deionized water is prepared at DWQ's lab and/or the state lab. It is tested by the state lab to ensure it is analyte-free.

Equipment Blank: A QC sample prepared to demonstrate that any contamination from sampling equipment is less than the allowable level described by data quality indicators identified in the DWQ QAPP or a project-specific SAP. Samples are collected by passing DI water through the entire sample-collection process, including pump tubing and filtration unit. These QC samples are preserved, transported, and analyzed in the same way as regular samples. Equipment Blanks evaluate contamination resulting from field sample collection, processing equipment, preservative techniques, and lab analysis procedures.

Equipment Rinse: Process of rinsing equipment with site water prior to sample processing. Performed after equipment decontamination from a previous site and before the next sample is collected. Transfer containers and equipment are filled ½ full with site or DI water, agitated, and emptied three times. This process is called a **triple rinse**. Triple-rinsing is an EPA verified procedure proven to remove and/or dilute contamination. It is important that every piece of reusable equipment that encounters site water is rinsed.

Field Replicates: Two (or more) sample sets taken separately (5 to 10 minutes apart), from the same sampling location. Replicates are collected and preserved, stored, handled, and analyzed identically to other samples. Field Replicates evaluate the effects from sample

	collection and laboratory analysis on the repeatability (precision) and representativeness of water chemistry measurements.
HDPE:	High-density polyethylene.
Lab Sheets:	These are printed instructions detailing bottles to be collected at a site. There is one lab sheet per location, and they are turned in with samples to the lab. Lab sheets may also serve as a chain of custody form for the state lab. See project specific SAP for more information.
Multi-parameter Sonde:	A multi-parameter water measuring device. It measures a suite of parameters including temperature, dissolved Oxygen, pH, conductivity, etc. Different projects may use different parameters.
PFD:	Personal floatation device
Sampling and Analysis Plan (SAP):	This document details the guidelines and data quality parameters specific for any project.
Split Samples:	Two (or more) subsamples taken from one water sample collected in the field. Enough water should be collected at one time for two unique samples. The sample must be well-mixed before splitting. The subsamples are placed into appropriate sample containers and preserved, stored, handled, and analyzed identically to regular samples. Split Samples are used to evaluate potential analytical bias, and thus comparability, between laboratories or analytical methods.
Thalweg:	The deepest and fastest part of the channel (most often), containing the most cross-sectional flow.
Transfer Bottle:	A ½ gallon bottle used to transport site water from the stream to the filtering location (i.e., the truck). It is replaced every day and triple rinsed between sites. This bottle contains no preservative.

4.0 HEALTH AND SAFETY WARNINGS

Hazardous conditions potentially exist at every waterbody. If unfavorable conditions are present at the time of sampling, it is recommended that the sampling be rescheduled. If hazardous conditions arise during sampling, such as lightning, high winds, rising water, or flash flood warning, personnel should cease sampling and move to a safe location.

When working in Utah and other warm climates, take steps to avoid heat induced illnesses such as heat stroke or heat exhaustion.

Use caution when working in waders as drowning hazards exist.

Take appropriate precautions when operating equipment and working on, in, or around water, as well as possibly steep and unconsolidated banks, bridges, or edges of ponds/lagoons. All field crews should follow DWQ health and safety procedures and be equipped with safety equipment such as proper wading gear, personal flotation devices (PFDs), gloves, first aid kits, cellular phone, etc.

Use caution when sampling from a bridge or boat and take appropriate actions to make the situation as safe as possible; suspend the sampling if conditions are unsafe.

Be careful to avoid contact with preservative (acid) found in some sample bottles. If minor skin contact occurs, rinse with copious amounts of water. If major skin or contact occurs, seek medical attention. During packing and handling of bottles, be sure that caps are tightly sealed.

Wear gloves or wash hands after sampling, especially when sampling wastewater discharges or ponds, lagoons, or other potentially contaminated sampling points at regulated facilities.

5.0 CAUTIONS

Sample cross-contamination can occur if sampling devices are not properly cleaned. Equipment blanks will be performed to demonstrate that all sample collection and processing activities requiring reusable equipment are contaminant-free.

When sampling wetlands, slow-flowing, or non-flowing water bodies, reach out into the waterbody away from the bottom sediment stirred up by wading to ensure an undisturbed surface water sample. A dip sampler may be required to avoid getting disturbed bottom sediments in the sample. Alternatively, samples may be collected from a boat, or other appropriate floatation device, accounting for wind and sediment drift (sample on the upwind side).

6.0 INTERFERENCES

Samples should not be filtered near a running vehicle motor/exhaust or a generator for risk of contamination by gasoline fumes. Additionally, sampling should not take place next to an individual who is smoking for risk of contamination by ash and fumes.

If the sample is to be filtered with the cartridge filter, the sample may require settling time if the sample is turbid. Make sure to keep the sample on ice and appropriately label it during this time.

Samples must be collected in appropriate sample containers with their respective preservative (prepared by state lab); failure to preserve a sample properly can lead to inaccurate results or invalidation of the sample by the laboratory.

Contamination may also occur due to agitation of bottom sediments or surface floating debris. To prevent this, do not take samples near the bottom and do not skim the water surface. If the stream is shallow avoid contaminants as best as possible. Also, samplers should collect samples upstream of where they are standing and should wait until after any disturbed sediments have been cleared by the current to collect the sample. Avoid sampling backwater or eddies.

Samples must be stored and handled appropriately (i.e., temperature, light sensitivity, and holding times); samples not meeting requirements may be invalidated by the laboratory or a data user.

Transfer bottles should be replaced at the end of each day and Geopump® tubing should be replaced once a month. This ensures that there is no plastic degradation or contamination.

7.0 PERSONNEL QUALIFICATIONS/RESPONSIBILITIES

DWQ personnel performing water sampling must be familiar with sampling techniques, safety procedures, proper handling, and record keeping. Samplers are responsible for attending refresher meetings held each spring/summer to review procedures and techniques. New staff will be trained in the field by DWQ trained personnel.

Cooperators are required to read this SOP annually and acknowledge they have done so via a signature page that will be kept on-file at DWQ along with the official hard copy of this SOP (see **Appendix**).

8.0 EQUIPMENT AND SUPPLIES

- ☐ Copy of this SOP
- ☐ Site details and description
- ☐ Map & GPS unit
- ☐ Copy of project-specific SAP
- ☐ Field notebook
- ☐ Waterproof pens/markers
- ☐ Lab Sheets
- ☐ Sample bottles and preservatives
- ☐ Clean, unused plastic jug (“transfer” bottle)
- ☐ Camera or tablet with camera capabilities
- ☐ Dip Sampler
- ☐ Bucket, rope
- ☐ DI water (carboys, half-gallon jugs, and squeeze bottles)

- ☐ Forceps
- ☐ Filter (depending on filtering technique):
  - ☐ Cartridge (0.45 µm, 800 cm2) Item #: 8000HF
  - ☐ Membrane:
    - ☐ Coarse Filter: (1 µm, 47 mm) Item #: AP1504700
    - ☐ Fine Filter: (0.45 µm, 47 mm) Item #: HAWG047S6
- ☐ Geopump® with quick-release pump head, with approximately 3 feet of tubing
- ☐ Cooler & Ice
- ☐ Safety gear
- ☐ Chest waders with belt or hip boots

9.0 PROCEDURE

9.1 Pre-Sampling Preparation

- Determine the total number of samples (including equipment blanks, replicates, or field splits) to be collected for the sampling event. Be sure to account for all sampling locations, parameters to be collected, sampling methods, equipment to be used, and other field information to be collected along with the sample. All of this information should be included in the project-specific SAP.

- Contact the laboratory to obtain the appropriate sample bottles and preservatives, and to confirm storage conditions and holding times.

- Obtain any necessary permission for site access.

- Print off necessary sample labels, sample tracking forms ("Lab Sheets" if using State Lab), Chain-of-Custody forms, and field sheets.

9.2 Sample Collection

9.2.1 General

At the site, pre-label all sample bottles. Note sampling conditions on field sheets or in field notes, as specified in the SAP. Collect water quality field parameters (via multiparameter sonde) prior to sampling or such that the sonde does not cause bottom sediments to be stirred up and collected in the sampling container (downstream of sample collection). Perform flow measurements after sample collection or downstream during sample collection. Always collect samples facing the sampling equipment or sample bottle opening upstream.

If a transfer bottle must be used to collect the sample, triple rinse the transfer bottle (or clean bucket) with site water before collecting the water sample. When triple rinsing, fill the container

at least half full each rinse, to ensure that there is enough water to remove contaminants, cap the bottle and swirl the water to help remove contaminants. Do not rinse individual sample bottles unless directed by the lab or the project manager. In most cases, bottles are obtained from the State Lab and are pre-cleaned and already contain preservatives.

If a sample has higher conductivity than 3500 µS/cm3 (measured using the multiparameter sonde), when labeling the bottles, write "High Conductivity" on each of the bottles. Additionally, write the actual conductivity on the space provided on the lab sheet.

Note: An equipment blank will be prepared daily or monthly during the sampling run to ensure one blank for every 10 samples or 10%. Equipment blanks are performed for all sample bottles types collected that day. However, it is unnecessary to complete an equipment blank for Biological Oxygen Demand (BOD) bottles. In all cases proper cleaning and equipment handling to avoid contamination in the field should be observed.

9.2.2 Sample Collection by Wading

Use this technique when the stream or other water body can be waded safely.

1. Label bottles with correct date, time, location, and initials.
2. Gather sample bottles.
3. Approach the sampling location, walking from downstream to upstream. Wait until flow clears disturbed sediments downstream before collecting the sample.
4. Samples should be collected in the thalweg (if possible) but if this area is too deep or swift, choose a point in the channel cross-section that best represents the intended sampling location, where water is flowing and appears to be well-mixed (avoid backflows and eddies).
5. If using a transfer bottle, triple rinse with site water. Do not rinse individual sample bottles because they are prepared by the lab and may contain a preservative.
6. Remove the sample bottle cap. Reach forward, facing the bottle opening into the current upstream and quickly plunge the container just below the surface. Be sure to leave some headspace in the sampling bottles. DO NOT OVERFILL.

Note: Avoid touching the bottle to the stream bottom. Avoid touching the inside of the bottle cap, lip of the container, or inside of the container. Avoid overfilling sample bottles containing preservatives. Avoid any surface scum or floating debris. Bottles filled to near the neck should be sufficient.

7. Bring the bottle up out of the water and immediately replace the cap.
8. Repeat for the remaining sample bottles.

9.2.3 Sample Collection from Bridge using a HDPE Bucket

When sampling using a bucket, make sure you have a tether that is long enough to reach the stream. When collecting samples, make sure there is enough water to take all the samples from one composite bucket.

1. Triple rinse HDPE bucket using the site water
2. Deploy the bucket by lowering to the stream and filling with enough water.
3. Retrieve the bucket carefully to avoid contamination from the bridge debris.
4. Pour bucket water into respective sampling containers.

Note: Avoid touching the bottle to the stream bottom. Avoid touching the inside of the bottle cap, lip of the container, or inside of the container. Avoid overfilling sample bottles containing preservatives. Avoid any surface scum or floating debris

9.2.4 Sample Collection from the Bank/Edge using Dip Sampler

Use this technique when water is flowing too fast or is too deep to safely wade out into the stream, and if there is no bridge present. A dip sampler (a sample bottle holder with an extension handle) may be used to reach further out in the cross-section to an area with more flow. If flow is too fast to use a dip sampler, simply collect the sample by hand from the shore at an area along the bank where water is flowing and appears to be well-mixed.

1. Label bottles with correct date, time, location, and initials.
2. Gather sample bottles and triple rinse dip sampler downstream of where you're sampling. Remove the sample bottle/sampling container cap.
3. Fill the dip sampler using procedures above and carefully pour the sample into the individual sample bottles, being sure the sample is well-mixed before each pour.
4. Be sure to leave some headspace in the sampling bottles.
5. Bring the bottle/container up out of the water and immediately replace the cap.

Note: Avoid touching the bottle to the stream bottom. Avoid touching the inside of the bottle cap, lip of the container, or inside of the container. Avoid overfilling sample bottles containing preservatives. Avoid any surface scum or floating debris.

9.3 Sample Filtering

Overview: If dissolved metals and/or dissolved nutrients analysis is required; samples should be filtered in the field as soon as possible following collection.

Note: Equipment blanks will be prepared daily or monthly during the sampling run to ensure one blank for every 10 samples or 10%. Equipment blanks are performed for all sample bottles types

filtered that day. In all cases proper cleaning and equipment handling to avoid contamination in the field should be observed.

9.3.1 Sample Filtering: Membrane Filter

See **Figure 1** for a visual of the equipment set-up.

1. Rinse the outside of the intake tubing that will be in contact with the sample thoroughly with site water.
2. Place the intake tubing into the transfer bottle or bucket.
3. Turn on the pump and flush the filter holder and tubing with at least 250 mL of site water, using the pump to pull the site water through the filtering apparatus.
4. Turn off the pump.
5. Homogenize the site water sample by gently inverting the sample container several times. Alternatively, swirl the bucket to homogenize.
6. Place the intake tubing into the site water sample container avoiding introduction of contaminants.
7. Unscrew the filter holder to access the filter stage, being careful to not touch the inside of the filter holder.
8. Using clean forceps, load the filter holder with an unused membrane filter, being careful not to touch the filter and be sure to place the filter with the gridded side down (see Figure 1) Ensure that the membrane filter is securely placed in the holder.
9. If the water sample has any visible turbidity, overlay the membrane filter with a glass-fiber pre-filter. The pre-filter should be "upstream" of the membrane filter.
10. Screw the filter holder back together.
11. Turn on the pump and hold the filter holder over the sample bottle, being careful to not let the filter holder contact the lip or inside of the bottle.
12. It is very important to continuously swirl the site water sample container during filtration to ensure homogenous samples.

Note: Avoid touching the inside of the bottle cap, lip of the container, or inside of the container. Avoid overfilling sample bottles containing preservatives.

13. Turn off the pump.
14. Immediately replace the sample bottle caps.
15. Remove the used filters and discard.
16. Drain the filtering apparatus and tubing.

17. Protect tubing ends from contamination by placing them in a clean bag between sites.

18. At the end of the day, rinse the sampling equipment and perform an equipment blank.

Note: If the filter clogs before the sample bottles can be filled, the pump must be turned off, filters removed, and both filters replaced in the filter holder. If the sample is turbid and to be filtered with a membrane filter, the sample may require settling prior to filtering. Make sure to keep the sample on ice and appropriately labeled during this time.

9.3.2 Sample Filtering: Cartridge Filter

When using a cartridge filter, use one filter per sample set. After filtering, discard the used filter. See **Figure 2** for a visual of the equipment set-up.

1. Rinse the outside of the intake tubing that will be in contact with the sample thoroughly with site water.

2. Place the intake tubing into transfer bottle or bucket

3. Turn on the pump and flush the tubing with at least 250 mL of site water.

4. Turn off the pump.

5. Homogenize the site water sample.

6. Place the intake tubing into the site water to be filtered.

7. Attach the cartridge filter to tubing observing the flow arrow on the filter.

8. Turn on the pump and fill the sample bottle, being careful to not let the filter contact the lip or inside of the bottle.

Note: It is very important to continuously swirl the site water sample container during filtration to ensure homogenous samples. Avoid touching the inside of the bottle cap, lip of the container, or inside of the container. Avoid overfilling sample bottles containing preservatives.

9. Turn off the pump and immediately replace the sample bottle caps.

10. Remove the used filter and discard.

11. Drain the tubing.

12. Protect tubing ends from contamination by placing them in a clean bag between sites.

13. At the end of the day, rinse the sampling equipment and perform an equipment blank.

Note: If the filter clogs before the sample bottles can be filled, the pump must be turned off and the clogged filter must be removed and a new filter connected to the tubing.

9.4 Sample Handling and Preservation

Refer to **Table 1** or the project-specific SAP for specific sample handling and preservation requirements. For routine water chemistry samples that are analyzed at the State Lab, bottles come pre-cleaned with preservatives inside the bottles. These samples must be stored on ice or refrigerated immediately after sample collection until delivery to the laboratory.

Table 1. Sample preservation and holding time requirements for analyses performed by the State Lab (from the State Lab's 2012 Quality Assurance Program Plan).

Sample Bottle	Test: Method	Container Type	Vol.	Preserve	Holding Time
BOD	BOD5: SM 5210B	Plastic[1]	2 L	None, store at 4-6ºC	48 hr
Filter	Chlorophyll a: SM10200H	Foil wrapped in baggie	up to 2 L	Keep Frozen	21 days
Gen. Chem	Alkalinity, Total: SM2320B	Plastic[1]	125 mL	Store at 4-6ºC	14 days
Gen. Chem	Chloride: EPA 325.2	Plastic[1]	2 L	Store at 4-6ºC	28 days
Gen. Chem	Fluoride: SM4500F-C, EPA 300.0	Plastic[1]	125 mL	None Required	28 days
Gen. Chem	Ion Chromatography Bromide, Chloride: EPA 300.0	Plastic[1]	125 mL	Store at 4-6ºC	28 days
Gen. Chem	pH: EPA 150.1	Plastic[1]	2 L	None	Analyze Immediately
Gen. Chem	Silica: EPA 370.1	Plastic[1]	2 L	Cool 4-6ºC	28 days
Gen. Chem	Solids, Total Dissolved: SM2540C, EPA 160.1	Plastic[1]	2 L	Store at 4-6ºC	7 days
Gen. Chem	Solids, Total Suspended: EPA 160.2, SM 2540D	Plastic[1]	2 L	Store at 4-6ºC	7 days
Gen. Chem	Solids, Total Volatile: EPA 160.4	Plastic[1]	2 L	Store at 4-6ºC	7 days
Gen. Chem	Specific Conductivity: EPA 120.1	Plastic[1]	125 mL	Store at 4-6ºC	28 days
Gen. Chem	Sulfate: EPA 375.2	Plastic[1]	125 mL	Store at 4-6ºC	28 days
Gen. Chem	Turbidity: EPA 180.1	Plastic[1]	2 L	Store at 4-6ºC	48 hr
Nutrients	Ammonia: EPA 350.3	Plastic[1]	500 mL	H2SO4 to pH<2, store at 4-6ºC	28 days
Nutrients	Nitrate Plus Nitrite: EPA 353.2	Plastic[1]	500mL	H2SO4 to pH<2, store at 4-6ºC	28 days
Nutrients	Total Nitrogen: persulfate oxidation; SM 4500-N B, C (modified)	Plastic[1]	500 mL	H2SO4 to pH<2, store at 4-6ºC	28 days

Sample Bottle	Test: Method	Container Type	Vol.	Preserve	Holding Time
Nutrients	Phosphorus, total (as phosphate): EPA 365.1	Plastic[1]	500 mL	H2SO4 to pH<2, store at 4-6ºC	28 days
Nutrients	Total Organic Carbon: SM 5310B,C	Plastic[1]	500 mL	H2SO4 to pH<2, store at 4-6ºC	28 days
Metals	Mercury: EPA 245.1	Plastic[1]	250 mL	HNO3 to pH<2	28 days
Metals	Selenium by Hydride: SM 3114C	Plastic[1]	250 mL	HNO3 to pH<2	6 Months
Metals	Total Metals (surface and wastewater): EPA 200.7, EPA 200.8, EPA 245.1 (Mercury)	Plastic[1]	250 mL	HNO3 to pH<2	Mercury: 28 days Other Metals: 6 Months
Metals (solids)	Total Metals (soil/sediment, sludge): EPA 6010, EPA 6020, and EPA 7471 (Mercury)	Wide Mouth Plastic[1] or Glass[2]	4 oz3	Store at 4-6ºC	Mercury: 28 days Other Metals: 6 Months
Special	Chromium VI: EPA 218.7	Plastic[1]	250 mL	Store at 4-6ºC	24 hr
Special	Coliforms, Total & E. coli (surface waters): SM 9223B	Sterile plastic	100 mL	Sodium Thiosulfate, store at 4-6ºC	8 hr
Special	Color: EPA SM 2120B	Plastic[1]	250 mL	None, store at 4-6ºC	48 hr
Special	Cyanide (Total and amenable to chlorination): EPA 335.4	Plastic[1]	500 mL	NaOH to pH>12, Ascorbic acid (if TRC present)	14 days
Special	Ion Chromatography Bromate, Chlorate, Chlorite: EPA 300.0	Plastic[1]	125 mL	Store at 4-6ºC Ethylenediamine	14 days
Special	Odor: EPA 140.1	Amber Glass[2]	250 mL	None, store at 4-6ºC	24 hr
Special	Perchlorate: EPA 314.0	Plastic[1] or Glass[2]	120 mL	None	28 days
Special	Sulfide: EPA 376.2	Plastic[1]	125 mL	3 Drops Zinc Acetate & NaOH to pH>9	7 days
Special	UV-254: SM 5910B	Amber Glass[2]	4oz	None, store at 4-6ºC	ASAP, not to exceed 48 hr

[1] All plastic containers, as specified by the Method, will be new, with the proper preservative added for the type of sample to be collected.

[2] All glass containers, as specified by the Method, will be washed with soap and water, rinsed with DI water, rinsed with distilled water, and oven dried.

10.0 DATA AND RECORDS MANAGEMENT

Project-specific data and records management requirements can be found in the SAP. To maintain the integrity of sample site IDs, sample bottles must be labeled properly and the information on the label must match the information on the Lab Sheet, or other sample tracking or Chain-of-Custody form. Information on sample labels must be written in permanent ink. For routine samples to be analyzed at the State Lab, sample labels must contain the following information: DWQ site ID, site description, date, time, and sampler(s).

Before leaving the field site, be sure that all required samples have been collected, labeled, and that all appropriate field sheets, field notes, and sample tracking forms have been filled out completely and accurately.

If samples are for enforcement or may involve potential litigation, follow legal Chain-of-Custody procedures for sample handling and sample tracking (refer to *DWQ's SOP for Chain-of-Custody Procedures*).

11.0 QUALITY ASSURANCE AND QUALITY CONTROL

Representative samples are to be collected according to the sampling conditions described here, or as required under a project-specific SAP. The representativeness of samples is a function of the site location as well as of the manner in which water was collected. A representative sample should accurately reflect the chemical composition and physical/biological characteristics of the stream reach (or other water body segment) at the moment the sample was collected. Most sampling conducted by DWQ is intended to occur at a limited number of sampling sites over a range of hydrologic conditions, and when combined with accurate flow measurements reflects changes in pollutant and natural constituent loads of ambient waters over time.

To ensure that samples are representative, samplers should not alter designated sampling locations or times unless otherwise directed by a project manager. Stream sampling should be performed across a wide-range of hydrologic conditions that occur at the designated sampling locations. However, when hydrologic conditions are far from normal, for example during overbank flooding, when streamflow is absent, or when the site is affected by backwater conditions, samplers should refer to a project-specific SAP (if applicable), or otherwise contact the project manager for further instructions. Samplers should record in field notes any site conditions that may lead to an unrepresentative sample and should take site photographs to record these observations. Samplers should also be observant of any potential sources of pollution in the surrounding area of the sampling location, comment on these observations in the field notes, and notify the project manager upon returning to the office.

All sampling equipment must be decontaminated before and after use.

Equipment blank samples are used to determine if contamination is present during the collection and processing of samples. An equipment blank will be prepared daily during intensive

monitoring runs, or at least monthly for less-frequent monitoring, to ensure one blank for approximately every 10 samples or 10%. Each project will have a designated blank site ID.

Create the equipment blank in the field by filling and/or filtering all sample bottle types (collected that day) with DI water. Label the bottle with the "BLANK" site ID, time and process the equipment blank as a normal sample.

Quality control (QC) samples (equipment blanks, replicates, etc.) should be collected at the frequency given in the project-specific SAP. Minimum collection frequency and performance requirements for QC samples are given in DWQ's Quality Assurance Program Plan. **It is unnecessary to complete an equipment blank for Biological Oxygen Demand (BOD) bottles.**

12.0 REFERENCES

Faber, T. 2002. Standard Operating Procedure for the Collection of Chemical and Biological Ambient Water Samples. The Office of Environmental Measurement and Evaluation. EPA New England Region 1. Water Sampling 1.0.wpd, Revision #1, 7/24/2002.

Related DWQ SOPs:

Standard Operating Procedure for Calibration, Maintenance, and Use of Multiparameter Water Quality Sondes

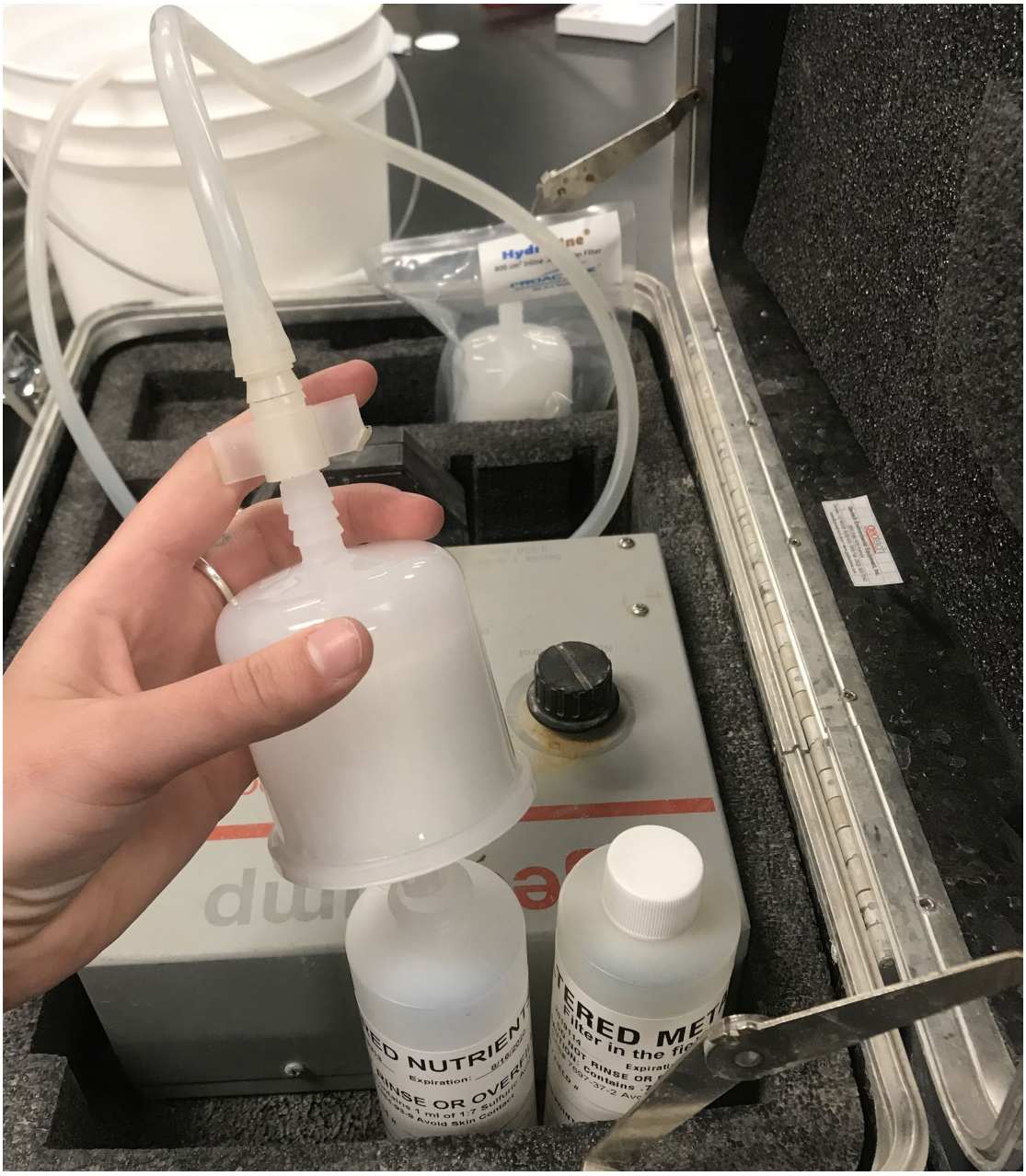
Standard Operating Procedures for Chain-of-Custody Samples

Standard Operating Procedure for Stream Flow Measurement

13.0 FIGURES

***Figure 1*: Membrane Filter Set-up: Gridded side down.**

***Figure 2*: Cartridge Filter Set-up.**



14.0 APPENDIX

APPENDIX 1 - SOP ACKNOWLEDGMENT AND TRAINING FORM

SOP Acknowledgement Form

This SOP must be read and acknowledged annually, and this form must be kept on file at DWQ.

Document Title:	
Document Revision Number:	
Document Revision Date:	

Please sign below in accordance with the following statement:

"I have read and understood the above referenced document. I agree to perform the procedures described in this SOP in accordance with the document until such time that it is superseded by a more recent approved revision."

Date	Printed Name	Signature

SOP Training Form

Training is required for all new samplers and Refreshers are required annually.

Trainee: Sign below to acknowledge that training on this SOP was received, understood, and all questions/concerns were addressed by the trainer.

Trainer: Sign below to acknowledge that training on this SOP was completed for the individual listed and that trainee is competent to perform the procedures described within.

Date	Trainee Printed Name	Trainee Signature	Trainer Printed Name	Trainer Signature
Management Approval				
Printed Name:				
Signature:				
Date:				