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STANDARD OPERATING PROCEDURES (SOPs) FOR SURFACE WATER SAMPLE COLLECTION

SURFACE WATER AMBIENT MONITORING PROGRAM

LAHONTAN REGIONAL WATER QUALITY CONTROL BOARD

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A. Scope and Application

These SOPs apply to the collection of surface water samples from streams as part of the Surface Water Ambient Monitoring Program (SWAMP). It includes procedures for collecting, filtering, and preserving samples for delivery to a laboratory for analysis of nutrients (i.e., species of nitrogen and phosphorus), and ions/minerals (i.e., sulfate, calcium, magnesium, silica, etc.).

B. Objectives

The primary objectives for collecting this data are to assist the Lahontan Regional Water Quality Control Board in assessing the ambient quality of surface waters in the Lahontan Region.

C. Sampling Equipment

Checklist:

- Copy of SOP
- Backpack
- Disposable, powder-free gloves
- Safety glasses
- Chain-of-Custody (COC) forms in sealed plastic bag
- Field notebook
- Clip board
- Sample bottle labels
- Pencil
- Ball point pen
- Permanent marker
- Hand vacuum pump w/ 1/4-inch (inside diameter) tubing
- Disposable, pre-cleaned nalgene cellulose-nitrate filter apparatus (90 mm dia., 0.45 µm)
- Reusable glass fiber filter apparatus
- Pre-combusted glass fiber filters (47 mm dia., 0.45 µm)
- New, pre-cleaned HDPE sample bottles (2 x 500 ml; 2 x 250 ml)
- Vials of acid preservative (2ml nitric acid)
- 500 ml HDPE waste bottle
- Deionized (DI) water for field method blank (if applicable)
- Ice chest
- Blue ice
- Packing tape
- UPS shipping labels

D. Field Information Required At Each Site

The following information shall be recorded on each sample bottle at the time of sampling:

- Sample ID Number (for contract laboratories)
- Sampling Date and Time
- Creek/Site Name
- Sampler's Name
- Analysis Requested
- Whether Sample is Field-Filtered or Raw
- Preservative (if any)

The following information shall be recorded in the field notebook:

At the start of the day:

- Project Name
- Date
- Weather Conditions (precipitation, cloud-cover, approximate temperature, and wind)
- Names of people in sampling crew.

At each site:

- Time of sample collection
- Creek/Site Name
- Sample ID Number
- Information about QC samples collected, if any.
- Comments (any pertinent observations such as cattle in stream, high turbidity, etc.)

E. Sampling Procedures

Collection of water samples will be conducted prior to or upstream from any other sampling activities that could disturb stream sediments and impact water quality (i.e., the collection of flow, sediment, or aquatic invertebrate samples).

1. Select a sampling location in a riffle zone at the upper end of the creek run to be sampled. Flowrate should be moderate, and creek depth sufficient to submerge the sample bottles at least 3 cm below the water surface.
2. Select a work area nearby that is as flat as possible and with minimal vegetation. Remove sampling equipment and supplies from the backpack, minimizing contact with soil, vegetation, etc.
3. Take field notes, label sample bottles, and fill out the chain-of-custody form(s) for the samples.
4. Put on disposable gloves and set up the disposable cellulose-nitrate filter apparatus.
5. Proceed to the sampling location with the 500ml sample bottle labeled for sulfate analysis. Rinse the surface of the gloves with stream water. Triple-rinse the sample bottle: fill bottle $\frac{1}{2}$

to 1/3 full; shake and rinse all internal surfaces; pour water out without disturbing stream channel; and, shake water droplets out of the bottle. For rinsing and sampling, fill the bottle by submerging the top of the bottle with the cap on 3 to 6 cm below the water surface, unscrewing the cap with the bottle opening facing upstream and tilted slightly up, and screwing the cap back on while still underwater.

6. Triple-rinse the cellulose nitrate filter apparatus with 250 ml of sample water: fill receiving apparatus with about 80 ml of sample water; rinse receiving vessel; pump sample through filter; rinse the receptacle bottle; discard; repeat twice more.
7. Filter remaining 250 ml of stream sample and triple-rinse the 500 ml sample bottle labeled for dissolved Ca, Mg, and silica.
8. Repeat 5, filter the sample, and pour into the 500 ml sample bottle labeled for dissolved Ca, Mg, and silica. Tighten cap and place sample in cooler on ice.
9. Set up the glass-fiber filter apparatus and insert a new filter. Repeat 5 and triple-rinse the filter apparatus with a total of 500 ml of stream water.
10. Repeat 5 and filter the sample. Triple-rinse the bottle labeled for Nitrate + Nitrite and SRP with a total of 250 ml of filtered sample. Following triple-rinse, pour remaining filtered sample into the bottle, tighten cap, and place in cooler on ice.
11. Repeat 5, tighten cap, and place sample in cooler on ice.
12. Triple-rinse and fill 250 ml bottle labeled for TKN and TP using the same procedure as 5. Tighten bottle cap, and place sample in cooler on ice.
13. Put on safety glasses and add one 2ml vial of nitric acid to the sample bottle labeled for dissolved Ca, Mg, and silica. Tighten cap and place back in cooler on ice. Place waste vial and cap in the waste container. Triple-rinse the vials prior to disposing as a municipal waste.
14. Double-check the sample bottle cap seals and arrangement of samples and ice in the cooler.
15. Break down the filter apparatus, removing the glass fiber filter just used.

F. Sample Hold Times and Required Reporting Limits

Table 1. Sample Holding Times for Each Analyte.

Analyte	Maximum Hold Time	Storage Conditions
Dissolved Ca, Mg, and Silica	28 Days	@ 4°C once filtered and acidified (pH<2)
Sulfate	28 Days	@ 4°C
Nitrate + Nitrite and SRP	48 Hours	@ 4°C once filtered
TKN and TP	???	@ 4°C

Table 2. Reporting Limits Required to Meet Sampling Objectives

Analyte	Reporting Limit Concentration (mg/L)	Notes/Comments/Source
Dissolved Calcium		
Dissolved Magnesium		
Dissolved Silica		
Sulfate		
Nitrate + Nitrite		
SRP		
TKN		
TP		

G. Personnel Qualifications

Field technicians should take an active part in at least two sampling events supervised by a qualified staff person before allowed to sample alone.

H. Quality Control

Duplicates: Duplicate samples shall be collected as determined by the SWAMP project manager. Approximately 10 percent of all samples collected shall be quality control samples. Duplicate samples should be noted in the field notebook, and may be noted as a duplicate on the chain-of-custody.

Field Method Blanks: The procedure for collecting a field method blank (FMP) consists of transporting sufficient DI water into the field and collecting a sample using identical sampling, filtering, and preserving procedures (if applicable) as described under sampling procedures above. The FMB sample should be assigned a fictitious sample location (i.e., Snowpeak Creek) and a unique sample ID, if applicable, so that the laboratory personnel are unaware that they are analyzing a blank.

Travel Blanks: The procedure for collecting a travel blank consists of collecting a sample of DI water in the laboratory. The sample should then be transported into the field along with the sample bottles to be used, and transported to the laboratory with the other samples, once they are collected. The travel blank should be assigned a fictitious sample location (i.e., Snowpeak Creek) and a unique sample ID, if applicable, so that the laboratory personnel are unaware that they are analyzing a blank.

Split samples and spiked samples are not currently part of the SOP.