

## 6.2.3 PROTOCOL FOR SAMPLING THE WATER COLUMN THROUGH ICE

### Overview

Quality assurance and control measures (see appropriate Protocol) and safety issues (see appropriate Protocol) should be adhered to. The Protocol identifies how samplers should sample, where the sample should be collected, and how to minimize the potential for contamination when collecting a sample. Sampling locations to be sampled in the winter should be located as close as possible to the open-water.

### Sources

Environment Canada and B.C. WLAP (2005 c), EMAN-N (2005), Alberta Environment (2006 a)

### Special safety concerns

It is important when sampling on ice that all safety precautions are followed. Identify before venturing on ice the climatic conditions of the previous weeks (i.e. warmer temperatures, rainfall). Ice thickness should be correctly determined with a probe bar. Special care must be taken at outflow and inflow areas; the movement of the water does not allow ice to form thickly.

### At a glance

**1** It is important to try and keep the sample location the same throughout the seasons. If during the summer the sampling is to be completed near a bridge, the site should be selected far enough upstream from the bridge to avoid contamination from road salt and sand during the winter season.

*keep area  
around drill  
hole clean*

**2** Clear loose ice and snow away from the sampling location and drill through the ice with an ice auger, either motorized or a hand auger. The area around the drill hole should be kept clean and free from potential contamination such as gas, dirt from the drill or boots, from snowmobile exhaust, etc. All the ice chips and slush should be removed from the drill hole using a plastic sieve. Allow several minutes for the water to flow freely under the ice, thus allowing potential contaminants to clear, before taking a sample.

**3** In shallow streams, samples should be collected approximately 0.2 m below the bottom of the ice using a grab sample if possible. In deeper waters, samples need to be collected with a weighted sampler.

**4** Lower a clean, opened 2L bottle in a weighted sampler (with 2 to 3 kilograms of extra weight added) to the desired depth. If sampling in a current, the weight should be enough to reduce the sampler's downstream drift. Lower the bottle into the river at a rate that will give a depth- integrated sample.

*avoid  
stream  
bottom*

**5** Do not let the sampler come in contact with the streambed. This may stir up bottom sediments and contaminate the water sample. Raise the filled bottle from the river and use the water to rinse it, if conditions permit. Repeat steps 1 through 4 until the bottle is re-filled.

*rinsing in  
extreme  
cold* **6** In extreme cold temperatures well below freezing, do not rinse bottles with sample water, the sample water will freeze to the surface of the bottle. Alternately, rinse the sample bottles with laboratory-certified water in the vehicle prior to sampling following normal rinse procedures.

**7** Record ice depth and total depth. All sample bottles should be clearly labeled with date, time, location, site, depth, analysis required and sampler identification. Store and transport all samples at 4°C in a closed cooler. Collapsible jugs of warm water can be used in the cooler between the samples to prevent the samples from freezing. Do not allow the samples to freeze.

### Collecting field blanks

**1** Winter field blanks for stations that are sampled through ice consist of bottles filled with de-ionized water. These field blanks are processed as follows: remove the cap from the acid-washed field blank bottle containing de-ionized water, and expose the de-ionized water in the bottle to the air for approximately the same amount of time it takes to collect a regular water sample. Using this bottle, fill the metals bottle from field blank sampling kit with the de-ionized water.

**2** Remove cap from the regularly washed 2-litre field blank bottle (size may vary with laboratory) containing de-ionized water and expose de-ionized water to air. Fill all remaining bottles from the field blank sampling kit using the de-ionized water from this bottle.

**3** Complete the field form. Measurements of air temperature should be included; measurements of water temperature are not required.

### Collecting replicate samples

**1** After the field blank has been processed, fill a 2L bottle (size may vary with laboratory) marked as a regular sample and fill the metals bottles from the replicate kit and the regular sampling kit at the same time. Next fill a second 2L bottle (size may vary with laboratory) and fill each of the bottles from the replicate and regular sample kits simultaneously. For example, fill a 1L plastic bottle (size may vary with laboratory) from the replicate and regular sample kit together. Repeat until all the bottles from the replicate and regular sample kits are filled.

**2** Once the replicate sample has been collected, complete the field form as normal. Ensure that preservation and field analysis of the samples is carried out. Tape the lids closed on all the sample bottles so that they do not accidentally come off. Carefully re-pack the bottles so that they do not break during transport.

### Other sources

ISO (2008 a), BC WLAP (2003), Environment Canada (1999), Newfoundland and Labrador Environment and Conservation (1999), Saskatchewan (Undated)