Standard Operating Procedure for Collection of Sediment Samples

David N. Edgington
Great Lakes Water Institute
University of Wisconsin
Milwaukee, WI

and

John A. Robbins
Great Lakes Environmental Research Laboratory
NOAA
Ann Arbor, MI

1991

Standard Operating Procedure for Collection of Sediment Samples

1.0 Scope and Application

The application of this sampling procedure is for the collection of sediment cores, using a box corer, for the analysis of radionuclides to provide estimates of the sedimentation rate and mixing depth for the GLNPO Lake Michigan Mass Balance Study.

2.0 Summary of Procedure

Before any box cores are taken, test grabs, using a ponar, will be taken to determine the suitability of the sediment for coring. If coring is possible, then the box corer will be deployed. Once the box coring is completed and box core is back onboard the ship, then four 10 cm (ID) plastic tubes will be inserted by hand into the Master box core, thereby creating 4 subcores (A-D). Each of the subcores will be sectioned and these subsamples stored for future analysis.

3.0 List of Equipment

Item	Quantity
Modified box corer (Soutar corer)	1
Box corer extraction rigging	1
Set of critical spare parts for box corer and extraction rigging	1
Hydraulic extruding stand for 4" diameter subcores	1
Set of core sectioning gear	1
125 mL Polyethylene bottles/ pre-labeled and tared	as needed
Ponar grab sampler	2
Winch for Ponar deployment	1
10 cm/4" diameter subcore butyrate tubes	12
vacuum-extractor caps	2
Portable vacuum pumps with tygon tubing	2

4.0 Sampling Procedure

4.1 Test grabs, using a Ponar grab sampler, will be taken to determine the suitability of the sediment for coring. If three grabs return without a sample, then the site will be vacated. If the Ponar grabs are obtained but coring is not feasible, then surface samples from the grabs will be obtained. If coring is possible then box coring will be undertaken as long as there appears to be a limited risk of damage to the box core.

4.2 Once the box core has been retrieved and is back on the ship's deck, then the core is examined for acceptability. This examination is done by using the viewing window on the front side of the box core. If the core is unacceptable, then the contents of the box core will be released and the box corer redeployed.

4.3 Acceptable box cores are sub-cored by carefully inserting a 10 cm diameter butyrate tube into the core. Distortion of the sediment during the tube insertion is minimized by the application of a partial vacuum to the tube top. By continuous manual adjustment of the vacuum as the core is inserted, the interface within the tube remains in alignment with the interface of the surrounding sediment in the box core.

4.4 Sediments within the tube are hydraulically extruded and sectioned onboard the ship. Extrusion is done by the application of water pressure from the ship's hose line to a rubber stopper inserted into the base of the core tube. Fine control of water flow allows slow movement of the core upward into a separate short section of tube (the collar) placed in-line with the core tube top. The collar is scribed in cm intervals so as to define the amount of core section to be displaced laterally into an aluminum receiving tray.

4.5 Sub-core taken for the analysis of radionuclides will be sectioned with plastic utensils.

4.6 Sub-core samples are stored in conformity with EPA QA/OC requirements.

4.7 A back-up core is taken in case of unexpected problems in analyzing the first core or if an interest in analysis of additional material develops.

4.8 Core lengths are expected not to exceed 50 cm in length and should more than cover the entire post-settlement history of deposition.

4.9 A detailed record of the sediment characteristics, as a function of depth, as well as a notation of any unusual properties (i.e. large wood chips) will be entered in the sampling log. An example of the sampling log form is shown in Figure 1.

5.0 Sample Custody

After the sectioning of each core, the Co-PI's will verify that all the samples are accounted for and that they are transferred to proper storage. After sampling has been completed and the samples transported to the lab, the CO-PI's will again verify that all samples have properly transferred and stored. The location of all samples is noted in the sample log.

6.0 Sample Labeling and Logs

Prior to each sampling event a complete set of sample bottle labels will be prepared. The number and type of these labels will depend on the length of the sediment core recovered and the estimated sedimentation rate. An example of a typical label is seen in Figure 2.

Lake Michigan Mass Balance and EMAP Study Sediment Sampling Log

Station No_____ Core No_____

Date_____ Time_____

Latitude_____ Longitude_____

Section	Description	Section	Description
0 - 1		29 - 30	
1 - 2		31 - 32	
2 - 3		32 - 33	
3 - 4		33 - 34	
4 - 5		34 - 35	
5 - 6		35 - 36	
6 - 7		36 - 37	
7 - 8		37 - 38	
8 - 9		38 - 39	
9 - 10		39 - 40	
10 - 11		40 - 41	
. . .	. . .	. . .	. . .
28 - 29		59 - 60	

Sectioned by_____ Recorded by_____

Samples Checked by_____ Received & Checked by_____

Samples Stored at_____ Date_____

Figure 1. Sediment Sampling Log

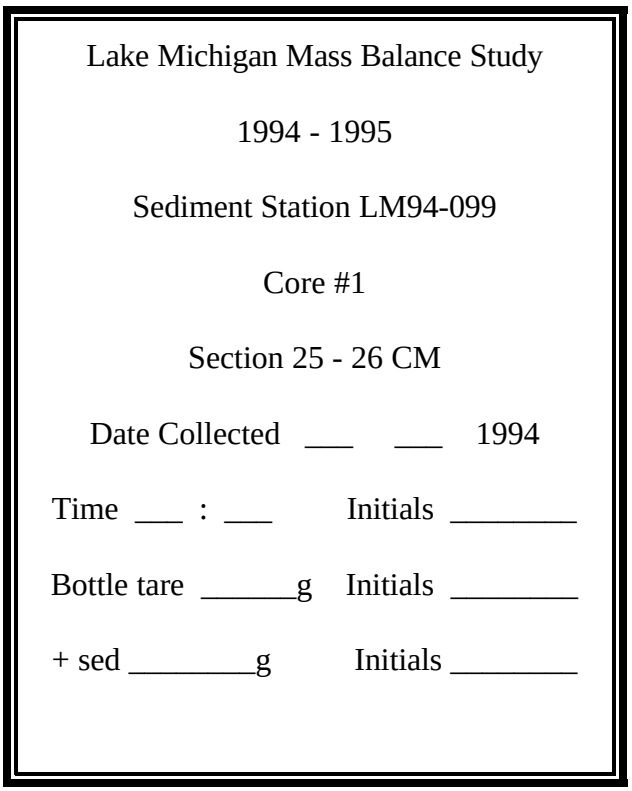

Figure 2. Sample Bottle Label