Standard Operating Procedure for Sample Collection of Atrazine and Atrazine Metabolites

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1.0 Procedures

1.1 Water will be collected using the method outlined in LMMB 013, *Field Sampling Using the Rosette Sampler*. The rosette will be deployed and retrieved in accordance with standard ship operating procedures.

Sampling locations and depths are outlined in Section 2 with a map provided in Figure 1.

1.2 Sampling Open Water Stations

If the water column is stratified, sampling depths will be the mid-epilimnion and mid-hypolimnion. If the water column is not stratified samples will be collected two feet below the surface and at the mid-water column. The following stations are to be sampled as open water stations: mb63, mb72, mb57, gb24, gb17, 45, 52, 43, mb38, 31, 36, mb26, mb25, mb24, mb21, mb20, mb19m, 340, mb13, mb9, 17, 1, 5, 3.

In addition, duplicate samples should be collected at Station 1 and Station 72m.

1.3 Sampling Master stations

Stations 18 and 41
If the water column is stratified, samples should be collected at the following depths: 2 ft below the surface, 5 ft below the surface, mid-epilimnion, thermocline, mid-hypolimnion, and 5 ft off the bottom. Duplicate samples should be taken at the 2 ft below the surface and 5 ft off the bottom depths.

If the water column is not stratified samples should be taken 2 ft below the surface, mid-water column, 5 ft off the bottom. Duplicates should be collected at all of these depths.

Stations 23, 27, 47
If the water column is stratified, samples should be collected at the following depths: 2 ft below the surface, mid-epilimnion, mid-hypolimnion, and 5 ft off the bottom. In addition, duplicate samples should be collected from all depths at Station 23. These samples will be labeled with "BE Dup.", and are samples to be used in a comparison study.

If the water column is not stratified, samples should be collected 2 ft below the surface, mid-water column and 5 ft off the bottom. Duplicate samples should be collected from all these depths.

1.4 Sample Collection

1.4.1 Objective: Water will be transferred from individual rosette canisters to amber 1 L bottles and placed in cold storage until processed by scientists from the University of Minnesota.

1.4.2 Once the rosette has been carefully positioned to its proper location on the deck of the

ship examine the canisters to confirm that all canisters slated for sampling have properly fired.

1.4.3 All operations executed on the deck of the ship require personal flotation devices to be worn.

1.4.4 Remove amber 1 L bottle from storage area and visually inspect for cracks or severely chipped cap threads.

1.4.5 Confirm with marine tech. or other rosette operator which sampling depths correspond to which rosette canisters.

1.4.6 With the sampling depth of each canister noted, vent lower valve on canister allowing water to drain out. Allow several hundred milliliters to drain out before sampling.

1.4.7 Remove cap and aluminum foil from amber one-liter bottle. Rinse bottle and cap three times from the canister discharge stream. Be sure to rinse bottle and cap with the same water that is to be sampled. Use about 200 mL for each rinse, and thoroughly wet all interior surfaces of bottle.

1.4.8 While filling bottle be careful not to place aluminum foil on any dirty surface or to allow aluminum foil to wash or blow away. While the amber bottle is uncapped the cap should be placed upside down (concave surface up) on clean surface and aluminum foil placed inside of cap.

1.4.9 Once bottle has been thoroughly rinsed carefully fill bottle with water. Fill bottle to within 1 or 2 cm of the very top of the bottle.

1.4.10 While filling bottle be careful not to touch discharge stream before it enters the bottle, and be sure not to let any foreign debris enter the bottle. Avoid all possible contaminants including smoking.

1.4.11 For each depth a 2 L sample is required, therefore, two one liter bottles should be filled for each depth. Each sample must come from the same rosette canister even if two canisters are fired at the same depth.

1.4.12 Label bottle and cap. A label is provided on each bottle. The label has locations marked for the following information: Lake, Station, Date, Depth, and code number. The code number is simply the sequential number of the sample. i.e, the first sample collected is 1, the second 2, etc. Numbering will continue in progressive order throughout the mass balance study, *do not* start renumbering at each location or in each lake, i.e. the last sample collected will have a code number of about 550.

1.4.13 Since there are two bottles per sample depth, label one sample “a” and one “b”, e.g., a code number might be la and 1b or 450a and 450b.

1.4.14 The code number should be written on the cap of each bottle as well as the label. The code number is the only information necessary on the cap. A labeling surface is provided on each cap.

1.4.15 When labeling has been completed move to next canister.

1.4.16 Once water from all required depths has been transferred to amber bottles, carefully move bottles to cold storage. Cold storage will be the walk-in cooler provided on board the ship. Storage crates are provided but care should be taken to ensure that crates are secure while ship is moving.

1.4.17 The walk-in cooler should be maintained at approximately 4°C. The cooler should not be any colder than this since it is possible that the samples would freeze and break the bottles. If the cooler goes above 10°C for any period over an hour a note should be made of this in the sample log book.

1.4.18 Once samples are secure in cold storage, information about the samples collected and the sampling site should be entered into the sample log book provided by the University of Minnesota. All information on bottle labels should be entered into the log book as well as a sketch of a temperature depth profile, a note on weather conditions, and who collected the samples.

1.4.19 The temperature depth profile should list the surface temperature of the water the hypolimnion temperature, and the location of any stratification. An accurate temperature depth profile is available from the EBT printout. An example of a sample log sheet is included.

2.0 Sample Locations

Remember:

Rinse three times
Fill two bottles per one sample
Label bottle and cap

2.1 Open Water Stations:

2.1.1 If Stratified
*Mid Epi
*Mid Hypo (If possible sample hypo at depth that corresponds to mean particle mass as measured by transmissometery)

2.1.2 If Not Stratified
*2 ft below surface
*Mid water column

Collect duplicates of two open water stations. One station in Northern LM and one in Southern LM. Put "DUP" on label.

2.2 Master Stations:

2.2.1 If Stratified

Stations 18 and 41
*2 ft below surface *plus duplicate*
*5 ft below surface
*Mid Epi
*Thermo
*Mid Hypo
*5 ft off bottom *plus duplicate*

Stations 23,27, 47
*2 ft below surface
*Mid Epi
*Mid Hypo
*5 ft off bottom

*Plus duplicates of all depths at Station 23 and put "BE DUP" on label

2.2.2 If Not Stratified

All Master Stations (18, 23, 27, 41, 47)
*2 ft below surface
*Mid water column
*5 ft off bottom

*Duplicates of all depths at Stations 18, 23, 41 (put BE on Station 23 label)

Mark Station 18 and Station 41 Duplicates with "DUP", Station 23 with "8E DUP" in addition to regular sample label.

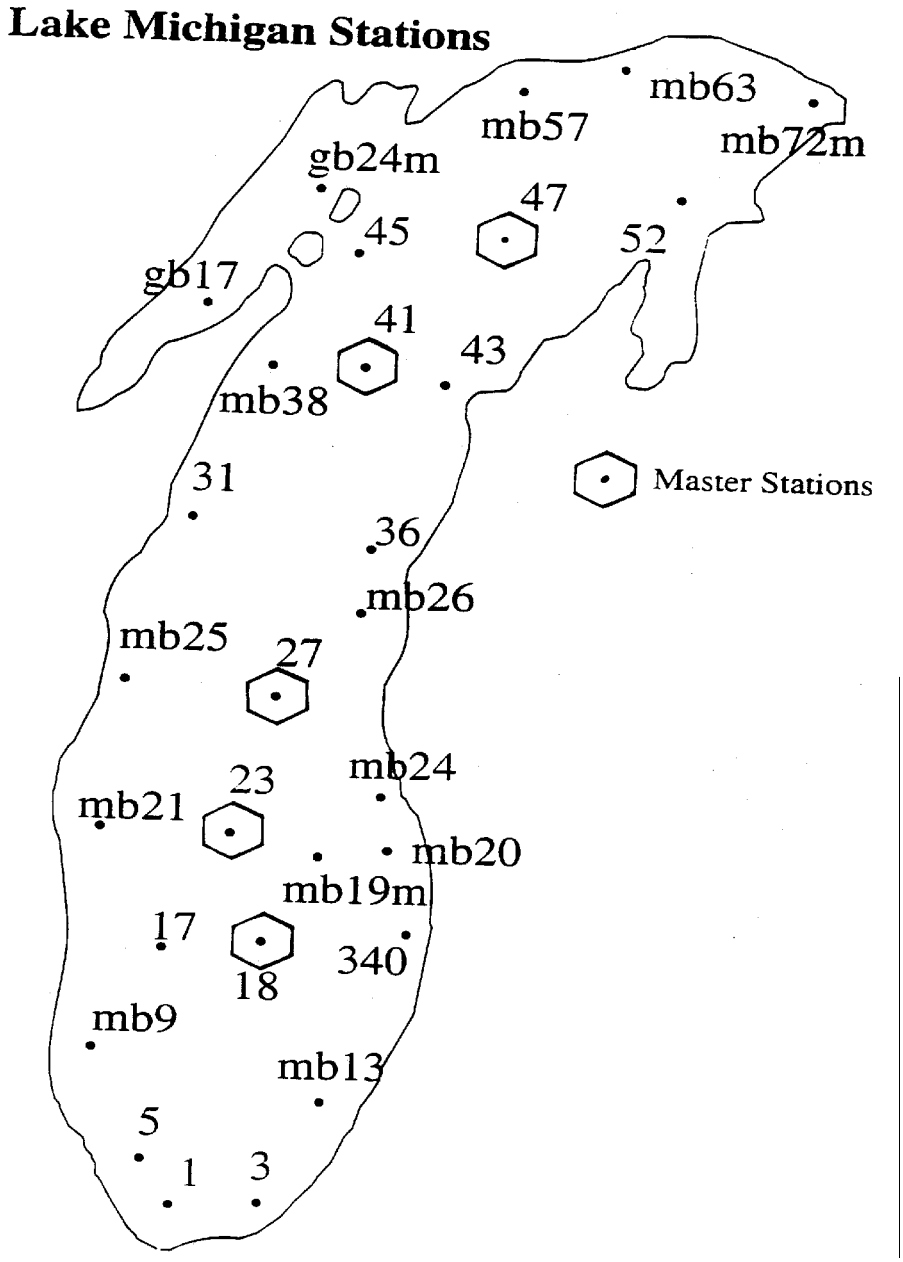
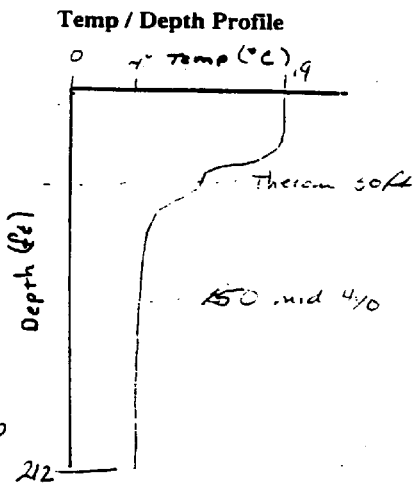


Figure 1
Lake Michigan Stations

Herbicide Sample Log

Date: May 5th 1994
Lake: L. Mich
Station: 18
Collector: SPS

Depth (ft)	Code #
2	12a-b
5	13a-b
12	14a-b
30	15a-b
150	16a-b
212	17a-b
2	18a-b dup
212	19a-b dup



Date: May 6th 1994
Lake: L. Mich
Station: 47
Collector: SPS

Depth (ft)	Code #
2	
50	

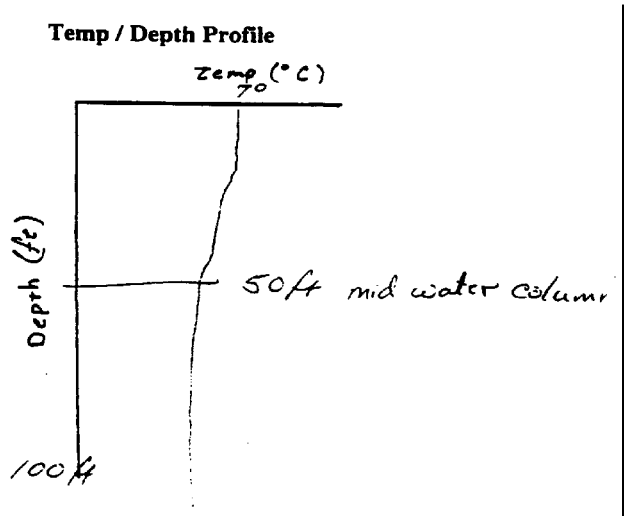


Figure 2
Herbicide Sample Log