

Protocol for Acquiring Sediments for Mercury and Methylmercury Analysis for the REMAP Assessment of Mercury in Vermont and New Hampshire Lakes

Sediments will be acquired using a Glew-design, modified KB corer with a 60 cm by 7 cm lexan core tube. The use of core catchers with the corer is discouraged due to their potential to contaminate surficial sediments during the coring operation. Prior to initiation of sampling, the core tubes will be cleaned using standard laboratory glassware cleaning procedures, followed by a two hour soak in 20% trace metal grade HNO₃. The tubes will be rinsed copiously in lake water prior to use, and will be copiously rinsed in lake water after sediments are removed. Core tubes will be stored in doubled, plastic bags between acquisitions. These bags will be replaced regularly.

Core tubes will be re-cleaned not less than after every tenth sample collected, or when the field coordinator determines that re-cleaning is necessary. Core sectioning tools (scraper, lexan sectioning tray) will be cleaned following the same schedule and protocol as core tubes, and will be stored in plastic as well. Sediment samples are stored in new, lot-certified 125 ml PETE bottles, which in turn are bagged in individual ziplock-style bags.

Due to the sensitivity of methylmercury to photo-degradation, cores must be rapidly sectioned in the field, as soon as practical after collection. Project staff will use gloves and an adapted clean hands-dirty hands protocol to avoid potential methylmercury contamination.

Procedure:

- Sample bottles and associated ziplock bags are labeled using a waterproof label and ink.
- ‘Clean hands’ and ‘dirty hands’ are designated.
- “Clean hands’ gloves with regular-length non-powdered vinyl gloves.
- ‘Clean hands’ rinses the core tube 3X in lake water, and places it into the corer head.
- ‘Dirty hands’ is responsible for handling the corer head and line, and for collecting the core. The core descent is tracked using SONAR. The corer should be released to free-fall such that an adequate depth of sediment is acquired, without causing surficial sediments to extrude out the top of the corer. In many undisturbed and forested north-temperate lakes, a 1.5 meter free-fall is sufficient.
- ‘Clean hands’ caps the core bottom upon its arrival at the surface with a rubber stopper which has been 3x rinsed in lake water. The top of the core is also capped to maintain pressure on the sediments.
- The senior crew member examines the core, deciding to retain or reject it.
- ‘Dirty hands’ uses tools to remove the lexan tube from the core head, while ‘clean hands’ holds the core.
- ‘Clean hands’ maintains the core upright, while, ‘Dirty hands’ assembles extrusion equipment.

- ‘Clean hands’ places the core onto the extruder.
- ‘Clean hands’ affixes sectioning tray onto the core tube.

- 'Dirty hands' uses tools to tighten associated fasteners.
- 'Clean hands' removes sectioning tools from their bags.
- 'Dirty hands' extrudes the core at one-cm intervals.
- While 'dirty hands' controls extrusion from the core bottom, 'clean hands' sections the sediment into the sample bottle. The first five one-cm 'cookies' are sectioned into the sample bottle. 'Clean hands' closes the sample bottle and places it into the ziplock-style bag, which is held open by 'dirty hands.' The sample is subsequently placed into a cooler with ice packs. A dark environment should be maintained around the sample whenever possible.

Observations regarding sediment color, texture, degree of hydration, and odor will be noted. Sediment samples will be submitted as bulk (unsieved).

Cores will be rejected and the core re-collected if:

- 1) sediments contact metal portions of the corer head (overflow);
- 2) the sediment-water interface is disturbed;
- 3) the field coordinator judges that a contamination may have occurred; the core is of poor quality; or
- 4) gaseous ebullition caused by temperature differential causes the core to break apart before sectioning.