Sediment Sample Collection
FSOP 2.3.2 (October 4, 2011)
Ohio EPA Division of Environmental Response and Revitalization

1.0 Scope and Applicability

1.1 This FSOP provides general procedures for sediment sample collection from shallow surface waters less than approximately two feet deep, areas of exposed sediment deposition adjacent to surface water bodies (e.g., exposed mud flats during low water conditions), and seeps. The methods, procedures, and sampling equipment selected for a sampling event should always meet the site- or project-specific data quality objectives (DQOs). Surface waters include rivers, streams, lakes, ponds, wetlands, springs, and seeps. In addition, surface water may be sampled from storm sewers, drainage ditches, man-made lagoons or impoundments, or areas of transient ponding.

1.2 This FSOP is not applicable for the collection of sediment samples from surface waters deeper than approximately two feet or if sampling with specialized sampling equipment. For sediment sampling in deeper water or sediment sampling using specialized equipment (e.g., dredges, coring devices, etc.), consult with the Division of Surface Water for appropriate methodology and procedures.

1.3 For the purpose of this FSOP, sediments are unconsolidated organic or inorganic materials deposited by or beneath a surface water body. The physical and chemical nature of sediments is strongly influenced by particle size. Relatively fine grained materials such as silts or clays with particle sizes less than 0.06 millimeters (60 microns) are preferred for chemical analysis. Larger sediment sizes may not retain chemical analytes of concern. Therefore, for the purpose of chemical analysis and the evaluation of chemical data, a representative sediment sample should contain a minimum of 30 percent silt and clay by volume. For a more detailed discussion of the definition of sediment and selection of sediment sampling locations and methods, consult the Ohio EPA Division of Surface Water Sediment Sampling Guide and Methodologies (2nd Edition, 2001).

1.4 Depending on project DQOs, either discrete sediment sampling or incremental sampling may be appropriate. Incremental sampling methodology is a structured composite sampling and processing protocol that reduces data variability and provides a reasonable estimate of a chemical's average concentrations for the area and volume of sediment being sampled. Please refer to FSOP 2.6.1, Multi-Incremental Sampling for Soils and Sediments, for DERR's incremental sampling procedures. If incremental sediment sampling is performed, then FSOP 2.6.1 should be used in conjunction with this FSOP.

2.0 Definitions

Not applicable

3.0 Health and Safety Considerations

3.1 Always be conscious of water hazards during sediment sampling, especially if sampling a lake, pond, lagoon, impoundment, river, or large stream.

3.2 Never enter a river or stream under high-flow conditions.

3.3 Be aware of trip or fall hazards along river banks and lagoon or impoundment slopes.

3.4 Be aware of the dangers of working near low-head dams (i.e., rapid flow and undercurrents) as well as hazards that may be posed by other man-made structures such as manholes, vaults, weirs, pump houses and associated electrical or mechanical equipment.

3.5 Always wear a personal flotation device if sampling from a boat or in the immediate vicinity of deep or swift water.

3.6 Follow Ohio EPA's Boating Safety SOP (SP10-12) if sampling from a boat.

3.7 Never walk on exposed sediment of unknown thickness, surface crust or partially submerged debris in a lagoon or impoundment.

3.8 Do not collect samples from a frozen lake, pond, lagoon, or impoundment unless authorized by a site-specific health and safety plan. Never collect samples from a frozen river, stream, or any other flowing water body that is frozen over.

3.9 When collecting sediment samples, use the "buddy system," with at least two persons present at all times.

3.10 Be aware of biological hazards, e.g., snakes, ticks, mosquitoes, and poison ivy areas, around water bodies.

3.11 Never enter an OSHA-defined confined space for any reason during surface water sampling activities. Only Ohio EPA Office of Special Investigation (OSI) staff or other appropriately trained staff are qualified to enter confined spaces for reconnaissance or sampling activities, and will perform such work as necessary in accordance with Ohio EPA's Confined Space Entry Policy (OEPA-SM-10-002).

3.12 Always review the site-specific health and safety plan (HASP) for site-specific sampling hazards before beginning work.

4.0 Procedure Cautions

4.1 If surface water sampling is being performed with sediment sampling, collect the surface water samples first to avoid entraining sediment into surface water samples.

4.2 If collecting multiple samples from flowing surface water, begin the sampling in a downstream direction and work upstream to avoid compromising sample quality.

4.3 Use a stainless steel spoon or trowel to collect sediment samples for organic chemical analyses rather than plastic implements that may serve as a source of cross contamination for certain organic chemicals.

5.0 Personnel Qualifications

Ohio EPA personnel performing field sampling activities must meet DERR's qualifications for performing work at uncontrolled hazardous waste sites.

6.0 Equipment and Supplies

6.1 Chain-of-custody forms
6.2 Clear tape
6.3 Decontamination equipment and supplies (FSOP 1.6, Sampling Equipment Decontamination)
6.4 Field logbook, field log sheets, or activity-specific field forms
6.5 Method-specific analytical sample containers with labels (preferably waterproof)
6.6 Paper towels
6.7 Pens and markers (preferably waterproof)
6.8 Personal protective equipment per the HASP and personal flotation device when working near deeper water
6.9 Plastic sheeting
6.10 Sample coolers
6.11 Sampling gloves
6.12 Shovel with long handle (to reach sediments in deeper water)
6.13 Stainless steel dippers or trowels for sample collection
6.14 Stainless steel pans or bowls
6.15 Waders or rubber boots
6.16 Water quality monitoring instruments, e.g., pH/temperature/specific conductance meter, dissolved oxygen meter, turbidity meter, as needed to achieve project DQOs

7.0 Procedures

7.1 If possible, conduct site reconnaissance to identify potential sampling locations. Investigate and probe for areas of adequate sediment accumulation, which are typically located in the quieter backwater or slack water areas in streams and rivers. In some areas of faster flowing water, "discrete" samples may have to be composited from several adjacent locations to obtain an adequate sample volume.

7.2 Set up a staging area on the water body bank or other dry area adjacent to each sample collection location. Place sample containers and equipment on plastic sheeting to avoid cross contamination.

7.3 If using pre-labeled containers, complete each label and seal with clear tape before sampling.

7.4 Use decontaminated or disposable equipment to collect each discrete or incremental sample.

7.5 Wear a pair of clean sampling gloves when collecting each discrete or incremental sample.

7.6 If surface water samples are also being collected for analysis at the same locations as sediment samples, collect the surface water samples first, then perform any required surface water field monitoring, and collect sediment samples last.

7.7 For the collection of discrete sediment samples:

7.7.1 For analytes other than volatile organic compounds (VOCs), collect sediment with a stainless steel spoon, trowel, or shovel and place it into a stainless steel pan or bowl. (If sufficient fine-grained sediments (silt and clay) are not available at the selected location, then sediment samples may need to be collected from several adjacent locations to obtain adequate sample volume.) Slowly decant excess water from the pan or bowl. Remove large rocks, twigs, leaves, and other debris from the pan or bowl. Gently homogenize the sample with a stainless steel spoon or trowel. Place the sample in an appropriate laboratory-supplied sample container(s) and preserve it as required.

7.7.2 For VOC analysis, place sediment directly into the laboratory-supplied sample container and close the container. If additional sample volume is needed from adjacent location(s), reopen the container at each additional location, add additional sediment as necessary, and close the container. Preserve the sample as required.

7.8 For collection of incremental samples, follow the procedures provided by FSOP 2.6.1, Multi-Incremental Sampling for Soils and Sediments.

7.9 After filling and labeling all sample containers, ensure that the chain-of-custody form has been properly completed and place each sample container in a sample cooler on ice for shipment or delivery to the laboratory.

7.10 Record all sample information on the attached Sediment Sample Collection Data Form (preferred). A field log book or other field log sheet may also be used to record the pertinent sampling information if the attached field data form is not used (refer to FSOP 1.3, Field Documentation).

7.11 Decontaminate stainless steel spoons, trowels, and shoves and any other sampling equipment used between samples in accordance with FSOP 1.6, Sampling Equipment Decontamination.

7.12 Dispose of investigation derived waste (IDW) in accordance with FSOP 1.7, Investigation Derived Wastes.

7.13 Follow all applicable criteria in FSOP 1.5, Sample Custody and Handling, when handling or shipping/transporting samples to the laboratory.

7.14 Clearly mark the discrete sampling locations or incremental sampling decision unit areas for global positioning system (GPS) surveying. If a sediment sample is being collected in conjunction with a corresponding surface water sample, mark the surface water location. If a discrete sediment sample is composited from several adjacent subset locations, mark the approximate center of the sample subset area.

8.0 Data and Records Management

Refer to FSOP 1.3, Field Documentation

9.0 Quality Control and Quality Assurance

Quality assurance/quality control (QA/QC) sample requirements are to be specified in the site-specific work plan. QA/QC samples may include duplicate samples, trip and equipment blanks and matrix spike/matrix duplicate samples depending upon the project DQOs. If VOC samples are being collected for analysis, at least one aqueous trip blank should be submitted per sample shipment.

10.0 Attachments

Sediment Sample Collection Data Form

11.0 References

FSOP 1.3, Field Documentation

FSOP 1.5, Sample Custody and Handling

FSOP 1.6, Sampling Equipment Decontamination

FSOP 1.7, Investigation Derived Wastes

FSOP 2.6.1, Multi-Incremental Sampling for Soils and Sediments

Ohio EPA, Division of Surface Water, Sediment Sampling Guide and Methodologies (2nd Edition), November 2001

Ohio EPA, Office of Safety and Labor, Safety SOP SP10-12, Boating Safety

Ohio EPA, Office of Safety and Labor, Confined Space Entry Policy OEPA-SM-10-002

Sediment Sample Collection Data Form

Ohio EPA Division of Environmental Response and Revitalization

Sample Identification:

Site Name_____

Sample ID #_____

Date_____ Time_____

Sampler_____

Sample Location Description:

Waterbody Name_____

Location[1]_____

Site Description[2]_____

_____

Latitude_____ Longitude_____

Velocity/Flow (circle one): *intermittent* *interstitial* *slow* *moderate* *fast* *very fast*

General Appearance _____

Surface Water Field Parameters:

Temperature_____ pH_____ Specific Conductance_____

Turbidity _____ Dissolved Oxygen _____ Other_____

Sample Collection Description:

Water Depth at Sample Location_____

Sediment Sample Depth Interval[3]_____

Sediment Description[4]_____

_____

Collection Method_____

Sample Type (circle one): *grab* *composite* *incremental*

Form instructions and site location map on opposite side of page

Form Instructions

Provide as much information as possible for a good description of the sample and sample location. The form is generally self explanatory, however, additional discussion is provided regarding a few of the categories below:

1. For **Location**, describe where in the water body that the sample was collected. This may be a relative location such as downstream from landfill or north side of pond. For streams, Division of Surface Water (DSW) river mile data may be included if desired. DSW river mile data is available at DSW's website: http://www.epa.ohio.gov/Default.aspx?tabid=3724.

2. For **Site Description**, include a description of the area where the sample was collected such as large pool at bend in stream. A sketch may be provided in the box below.

3. Measure **Sediment Sample Depth Interval** from the sediment surface.

4. For **Sediment Description**, include a general description of color, particle sizes, presence or debris or detritus, staining, etc.

Site Location Map and Description: