Sediment Sampling Protocol for NRDA

Sampling Objectives

The focus of this document is collection of sediment samples using specialized sampling equipment in either the subtidal or intertidal zone. Sediment samples may be collected to support various objectives during a natural resource damage assessment with focus on concentration and source identification. Samples may be taken to investigate an exposure pathway; to investigate levels at which biota in sediment are exposed; to assist in evaluations of weathering and fingerprinting of oil; to measure sediment characteristics for interpreting chemical and biological results; and for other reasons.

These protocols do not address sediment sampling objectives; prior to collecting samples a plan should be drawn up that clearly establishes specific sampling objectives including the types (e.g. depth of sample, composite versus discrete) and locations of samples to be collected. These protocols support natural resource damage assessments by providing the procedures that ensure sample integrity and the reliability of chemical characterizations as evidence in a damage assessment case. For detailed step-by-step instructions on how to collect various types of samples, refer to your workgroup sampling plan or other agreed upon SOPs.

Container and Sample Size

For hydrocarbons and TOC (combined)- single 500 ml (16 oz) jar filled ¾ full or two 250 mL (8oz) glass jars filled ¾ full

Grain Size - 100 g in resealable (e.g. Ziploc or Whirlpak) bag or 4 oz jar

Sampling Equipment/Containers

- Common subtidal sediment sampling devices include: Ponar, modified van Veen grab; Ekman grab; box dredge. Shovels and coring devices are commonly used in the intertidal.
- Sediment for a combined PAH, TPH and TOC sample should be placed in a certified-clean glass container with Teflon-lined lid. For grain size, Ziploc or Whirl-Pak bags can be used. If sample volume is split between two containers, both containers should receive the same sample ID (label the first container, "XYZ...1 of 2" and the 2nd container, "XYZ...2 of 2") and recorded on a single line of the COC form as two containers.

Subtidal Sediment Collection Methods

- All non-disposable sampling gear must be decontaminated before using and between sampling stations. Wash with laboratory-grade detergent and then rinse well with clean water. If taking multiple samples at an oiled station, decontaminate sampling equipment between samples.
- When surface slicks are present, avoid contaminating the sampler. Methods to open a sheen may include using a deck hose, disrupting the surface tension with literally only a one or two drops of kitchen detergent, or swiping with a sorbent pad. Thicker slicks may require deploying the sampler through a floating circle of sorbent boom (deploy collapsed, open on the water surface; use drop of detergent if an internal sheen persists).
- Lower and retrieve the sampling device at a controlled speed of ~1 foot per second. The device should contact the bottom gently; only its weight or piston mechanism should be used to penetrate the sediment. It is important to minimize disturbance to the surface floc which is likely to contain the oil contaminants.
- On retrieval, inspect the sample to make sure that it meets the following criteria:
  - the sampler is not overfilled; the sediment surface is not pressed against the sampler top.
  - overlying water is present, indicating minimal leakage and subsequent loss of floc.
  - sediment surface is undisturbed, indicating lack of channeling or sample washout.
  - the desired penetration depth is achieved (e.g., 4-5 cm for a 2 cm sample).
- Siphon or drain off the overlying water in the sampler until the sediment is exposed, paying special attention to retain the surface floc.

- Wearing nitrile or other non-contaminating gloves and using any appropriate clean scoop, meticulously collect just the top layer (see the workgroup sampling plan for exact depth[s]), avoiding sediments in contact with the sides or top of the sampler. To avoid cross-contamination, use a clean scoop for each sample.
- Onboard a sampling vessel, be aware of contamination sources (exhaust fumes, engine cooling systems, oily surfaces). Work up-wind of any exhausts. Segregate dirty/clean areas. Lay out clean substrates to work on and replace frequently. On each trip, try to sample least-oiled areas first, then the most contaminated areas.
- Immediately place all sediment samples in a cooler and keep on ice. Grain size samples should only be refrigerated; hydrocarbon samples can be frozen. Samples should be shipped or delivered to a Sample Intake Center within 2 days.

Intertidal Sediment Collection Methods

- Photograph the site before sampling (see GPS and photography bullet below).
- Wearing nitrile or other non-contaminating gloves and using an appropriate clean utensil (disposable or non-disposable), scoop surface sediments into the sampling jar. See specific workgroup objectives for desired depth of surface sediments (typically 1-2 cm).
- If subsurface samples are required, the shovel or coring device will need decontamination both between stations and between oiled samples. Wash with laboratory-grade detergent and then rinse well with clean water
- Immediately place all sediment samples in a cooler and keep on ice. Grain size samples should only be refrigerated; hydrocarbon samples can be frozen. Samples should be shipped or delivered to a Sample Intake Center within 2 days.

Labeling / Documentation / Other Considerations

- On the FTP site, the NRDA Field Sampling Checklist generically summarizes pre- and post-field sampling tasks.
- Prepare sample labels as presented in NRDA Data Management Protocol for Field Sampling. If using jars, record the sample number on both the label and lid. IDs on sample labels must be complete and identical to IDs on the chain of custody. Jar labels receive a protective layer of clear tape wrapped around the entire circumference of the container to secure the label and protect the writing. For grain size samples, place a sturdy paper label in indelible ink into the bag and repeat the label on the outside.
- See the event-specific protocol documents for shipping to designated labs (NRDA Sample Shipping Instructions) and for chain of custody and sampling documentation instructions (NRDA Data Management Protocol for Field Sampling). When and where possible, the Sample Intake Centers should be used to ensure compliance and sample integrity. Sediment sampling log sheets typically record sample number; date/time, location, GPS coordinates, water depth and penetration depth. They may also include surface sediment characteristics: texture, color, biota, debris, sheens, odor, etc.
- Documentation is critical; all field notebooks should be dated, signed and preserved. If crossing out or correcting any entries, date and initial when making the changes. Original records will be gathered and archived.
- Record the presence of oil, weather conditions, etc. in field notes. Record GPS coordinates for each sample.
- Take relevant photographs of the sampling locations and sample collection itself if possible. Make sure each photograph or series can be later associated with the corresponding sampling location GPS (see NRDA Field Photography Guidance). Do not delete, open or alter any photos.
- All sampling, COC, shipping, GPS and photo files are submitted to dwhsampleintake@gmail.com. Sampling hotline: 985-746-1394.
- The labs have received instructions specifying sample processing and analytic methods.