

Protocols For NRDA SurveysSTRANDED OIL QUANTIFICATION FOR BEACHESSampling Objectives

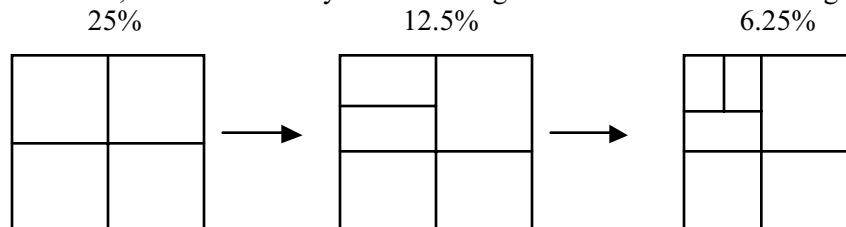
- To quantify the amount of oil on a sandy beach habitat for the following applications:
  - Support a mass balance for the fate of the spilled oil
  - Classify the shoreline segment into oil exposure categories (e.g., high, moderate, low)
- To supplement SCAT surveys conducted by responders or to obtain more detailed oiling information at certain sites. To the extent that other surveys are being conducted, try to use the same terminology and segment breaks and names

Survey Equipment/Guides

- Tape measure (30m)
- Shovel (absolutely necessary for subsurface oil)
- Small ruler (cm and inches) for thickness measurements
- SCAT forms, or field notebook
- Quadrat (1m<sup>2</sup>) for estimating percent cover
- Camera and photo scale
- Percent cover estimator guides
- Clipboard, pencils
- Calculator (one per person)

Calibration Exercises

- Conduct group calibration exercises at the start; include all survey teams in the training exercise
- Decide what units are to be used (e.g., English or metric, and feet versus yards)
- To calibrate Oil Distribution estimates (% cover), use a quadrat to estimate the percent cover, or the following method. Draw a ~1m<sup>2</sup> box in an oiled zone. Have everyone estimate % oil cover. Mentally herd the oil into one corner, or if possible, move the oil into one corner of the box. Draw a line to divide the original box in half. Keep halving the area until all of the oil fits into a corner. Estimate the area of the oil and compare with the original estimates. Repeat for different amounts of oil, AND until everyone is making similar estimates. See diagram below.



- To calibrate Length and Width estimates, use one of the following:
  - Measure out 30 m with a tape and have everyone determine their pace
  - Select various distances for visual estimation, then actually measure distances with a tape
  - If using a roller counter, calibrate it for the actual substrate using a tape

Survey Methods

1. It is strongly recommended that you use the SCAT forms and terminology. If the forms are not available, be systematic in how the parameters listed below are recorded in your field notebook. Those shown in **bold** should be major headings for recording the field data.
2. Assign a unique **Segment Name** to the beach that you are surveying. Pre-assign segment names to prevent duplication. Coordinate with response staff and use SCAT segments if available.
3. Walk or view the entire segment to get a sense of the different oil zones. Use a different **Zone ID** for each different oil occurrence, e.g., two distinct bands of oil, one at the high-tide line and one at a higher storm line, or along shore where the oil distribution changes from 10 % to 50%.
4. Describe each different zone of SURFACE oil in terms of its:
  - **Zone ID:** For consistency, use A for the first one described, then B, C, etc.
  - **Tidal Zone Location:** The location relative to low, mid, high, or supra (above high) tide.
  - **Width:** The average distance of the oil zone perpendicular to the beach.
  - **Length:** The distance of the oil zone parallel to (alongshore) the beach.
  - **Distribution:** The average percent cover of the oil in the zone (to the nearest 5%).

- **Oil Thickness:** Use SCAT terminology (stain, coat, cover, etc.) or record thickness in cm, to describe the thickness of any free oil on the surface.
  - **Oil Type:** Use SCAT terminology (fresh oil, mousse, tarballs, patties, etc.).
  - **Sediment Oiling Interval:** Where surface oil has penetrated into the sediment, record the thickness of the oiled band, from the sediment surface to the bottom of the oil (e.g. 0-5 cm).
  - **Sediment Oiling Degree:** Describe the degree of the oiled sediment, using SCAT terms or general categories of light, moderate, heavy. Collect representative samples of each category from several segments so that the actual oil content can be measured by chemical analysis and used to calculate total oil volumes. Refer to the intertidal sediment sampling protocol.
  - **Photograph:** Record any photographs taken of the oil in this zone. Use a photo scale to take representative photographs of each category, type and degree of oiling for calibration with other surveys and later illustration.
5. Determine the presence and extent of buried SUBSURFACE oil. Prospect for subsurface oil by digging small holes along the shore in areas of likely burial, such as high-tide berms, depositional areas near groins, or any subtle mounds of sand that suggest recent accumulation or deposition of sediments. If buried oil is found, dig additional trenches to define the areal extent of the buried oil layer(s). For each area of buried oil, record the following information:
- **Zone ID:** use the next letter in sequence.
  - **Tidal Zone Location:** the location relative to low, mid, high, or supra (above high) tide.
  - **Width:** the dimension of the buried oil layer perpendicular to the beach.
  - **Length:** the dimension of the buried oil layer parallel to the beach.
  - **Sediment Oiling Interval:** Record depths (from the sediment surface) to the top and bottom of the buried oiled layer (e.g., 5-10 cm, indicating that the buried oil layer started at 5 cm below the surface and was 5 cm thick). For multiple oil layers, record the interval of each.
  - **Sediment Oiling Degree:** Describe the degree of the oiled sediment, using SCAT terms or spill-specific categories of light, moderate, and heavy. Collect representative samples of each category from several segments so that the oil content can be measured by chemical analysis and used to calculate total oil volumes. Refer to the intertidal sediment sampling protocol.
  - **Photograph:** Record any photographs taken of the oil in this zone. Take a lot of photos!
6. Make a sketch of the entire segment you just surveyed, showing the locations of all oil zones you described and all photographs taken.
7. Make sure your notes are complete, and include the segment name, date and time of survey, tidal level at the time of the survey, unusual weather conditions, and team members name/affiliation.

### Definitions

Berm: the accumulation of sediment at the high-tide level; there may be multiple berms as tides goes from spring to neap.

Segment: a section of shoreline for which oiling observations are recorded. They ideally are 0.2 to 2 km in length and have relatively similar geomorphology and oiling conditions. They should be readily identified in the field (e.g., between two headlands, borders defined by street names).

### Other Considerations

- Samples may be needed for fingerprinting or monitoring of weathering, to correlate a visual description of sediment oiling degree with actual oil concentration, or to confirm the absence of oil. Be aware of the potential for contamination of the site from oil on boots and shovels when collecting samples. Refer to the Intertidal Sediment Sampling Guide.
- Take photographs of every oil zone. Keep a detailed photo log so that each photograph can be labeled and located as to the oil zone it represents. Label each roll with a unique code.

### Key Reference

NOAA, 2000. Shoreline Assessment Manual, Third Edition. HAZMAT Report No. 2000-1, Hazardous Materials Response and Assessment Division, NOAA, Seattle, WA. 57 pp. + appendices.