SAMPLE COLLECTION 8.4

The field team is responsible for determining what will comprise a representative sample with respect to study objectives and site characteristics. The bottom-material sample must resemble the native bottom material without loss of physical, chemical, and biological structure. The degree to which a single sample can be considered representative depends on many factors, including:

- Temporal and spatial homogeneity of the water body.
- Number and distribution of subareas sampled at a site.
- Method (statistical or deterministic) used to select sampling sites and subareas.
- Size of individual samples.
- Technique used to collect samples and results from the quality-control sample analysis.

Errors introduced by sampling can be the most significant in the entire data-collection process: always collect replicate samples for quality control.

Generic USGS data-collection efforts typically take a whole-system approach, meaning that data are collected using methods to ensure that an entire stream reach is represented. Special studies may require an approach for which samples are representative of a specific, targeted environment or portion of an aqueous system, instead of the entire system. Criteria and considerations for collecting a representative sample are summarized in table 8–3.

CAUTION: Do not jeopardize personal safety when working from boats, planes, bridges; on ice; or in flowing water.

Table 8–3. Criteria and considerations for collecting a representative sample of bottom material

Aspects of sample collection	Criteria and considerations
Equipment	• Sampling equipment penetration must be deep enough to provide a sample that meets project objectives. • Sampling equipment must be completely closed after proper penetration. • Weight of sampler (too light could produce improper deployment of sampler).
Techniques and methods	• Bottom-material disturbance prior to equipment deployment must be avoided. • Quantities of bottom material enclosed each time sampling equipment is deployed should be approximately equal. • Speed of sampler through water column (too fast will produce too large a shock wave in front of descending sampler and greater potential for sampler malfunction, but too slow could produce insufficient penetration, especially with core samplers).
Sampling environment	• Depth of water column (ensure adequate cable length to control speed of sampler deployment and personal safety when wading). • Physical, chemical, and biological character of water column above sample-collection site (especially presence or absence of oxygen). • Velocity of water currents (too fast could produce improper deployment of sampler). • Sampling platform stability (such as boat, ice, float plane).

8.4.1 SAMPLING PROCEDURES

Bottom-material samples must meet the sampling objective of the study. Use procedures that minimize sample disturbance and prevent contamination. Be aware that no procedure for collecting bottom-material samples can be used for every type of study objective and environmental setting.

Complete the following steps before beginning to sample:

1. Select sampling locations (refer to section 8.2 and table 8–4).

   a. Examine each site to be sampled in a manner that minimizes the site's problematic characteristics and maximizes its beneficial characteristics.

      - For perennial flowing water, consider collecting bottom-material samples after extended low-flow periods.
      - For ephemeral flowing water, consider collecting bottom-material samples just after a runoff event.