



Standard Practice for Collecting Benthic Macroinvertebrates with the Basket Sampler¹

This standard is issued under the fixed designation E 1468; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This practice covers procedures for obtaining qualitative and quantitative samples of macroinvertebrates in rivers, streams, lakes, and reservoirs. The device can be used in areas in which no other method is feasible.

1.2 Basket samplers are usually colonized by a wide variety of macroinvertebrates that actively and passively enter the current or the water column.

1.3 The method described in this practice facilitates the standardization of collection procedures at sampling sites and is excellent for water quality monitoring purposes. Standardized sampling is especially desirable when the results from different investigators and environments are to be compared.

1.4 The materials used in the basket sampler are natural or artificial materials of various compositions and configurations. The device is placed in water for a predetermined exposure period and depth for the colonization of macroinvertebrate communities.

1.5 The basket sampler can be used alone or can effectively augment bottom substrate sampling, because many of the physical variables encountered in bottom sampling are minimized (for example, variable depth and light penetration, temperature differences, and substrate types).

1.6 The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are for information only.

1.7 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*

D 1129 Terminology Relating to Water²

E 1469 Practice for Collecting Benthic Macroinvertebrates with Multiple-Plate Samplers³

¹ This practice is under the jurisdiction of ASTM Committee E-47 on Biological Effects and Environmental Fate and is the direct responsibility of Subcommittee E47.08 on Biological Field Testing.

Current edition approved March 15, 1992. Published May 1992.

² *Annual Book of ASTM Standards*, Vol 11.01.

³ *Annual Book of ASTM Standards*, Vol 11.05.

3. Terminology

3.1 *Definitions*—For definitions of terms used in this practice, see Terminology D 1129.

4. Significance and Use

4.1 The basket sampler is a highly effective device for evaluating the biological integrity of surface waters and for studying indigenous macroinvertebrate communities (**Refs 1-26**)⁴. Basket samplers are used to collect qualitative and quantitative samples from lentic and lotic waters containing indigenous benthic macroinvertebrates living on various types of substrates.

4.2 Physical factors such as stream velocity and depth may variably affect the degree of colonization. The sampling method is selective for drifting organisms (biased for insects) and for those that preferentially attach to or live on hard surfaces.

4.3 Basket samplers are excellent for water quality monitoring; contain uniform substrate types at each station for better comparison; provide quantitatively comparable data; contain negligible amounts of debris, permitting quick laboratory processing; and usually do not require additional weight for stability.

4.4 Basket samplers sample a known area at a known depth for a known exposure period. Basket samples provide no measure of the biota and condition of the natural substrate at a station. They record only biota accumulated during the exposure period.

4.5 The organisms in the sampler are used to define macroinvertebrate community characteristics in water quality studies and ecological assessments.

5. Description of Sampler

5.1 The type of basket sampler normally used (Fig. 1) is a cylindrical “barbecue” basket 11 in. (28 cm) long and 7 in. (17.8 cm) in diameter that is filled with approximately 17 lb (7.7 kg) of natural rocks varying from 1 to 3 in. (2.5 to 7.6 cm) in diameter (**16, 17**). A hinged door on the side provides access to the contents. An estimated 3.2 ft² (0.3 m²) of surface area is provided for colonization by macroinvertebrates. A 1/8-in. (3.2-mm) wire cable is passed through the long axis of the

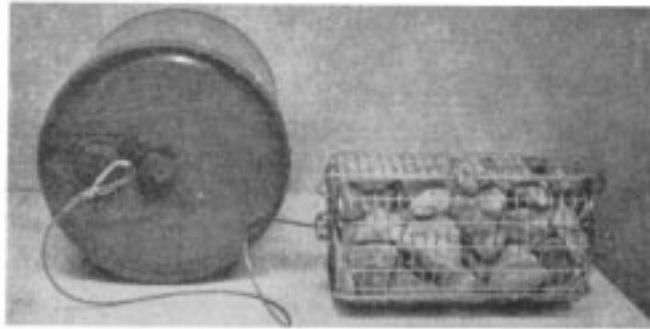
⁴ The boldface numbers in parentheses refer to the list of references at the end of this practice.



(a)



(b)



(c)

FIG. 1 Cylindrical “Barbecue” Basket Sampler: (A) Basket Sampler Empty; (B) Basket Sampler Containing Limestone Rocks and Ready for Installation; and (C) Basket Sampler Containing Limestone Rocks and Attached to 5-gal (19-L) Metal Container Filled with Polyurethane Foam. (Barbecue Baskets Available from Tenaco, 2007 NE, 27th Ave., Gainesville, FL 32609 or W.C. Bradley Enterprises, Inc., P.O. Box 1240, Columbus, GA 32993.)

basket; one end is fastened with a cable clamp, and the other end is fixed to the float. A 5-gal (19-L) metal container filled with polyurethane foam can be used as a float. A $\frac{3}{8}$ -in. (9.5-mm) steel rod threaded at each end is passed through the long axis of the float and fastened at each end by nuts. Three inch by $1\frac{1}{8}$ by $\frac{1}{8}$ -in. (25.6 by 3.2-mm) strap iron serves as a swivel at each end, secured on the rods by nuts. The wire cable used to suspend the basket is attached to the swivels by holes drilled for that purpose. The float can be attached to a stationary structure, or the basket can be anchored to the bottom in shallow water.

5.2 The rugged construction of the sampler is heavy enough to resist movement by water currents. Samples usually contain negligible amounts of extraneous material, permitting rapid laboratory processing.

5.3 A collapsible type of basket sampler has been used for comparing populations surrounding rocky substrates (7). The sampler consists of a collapsible basket surrounded by a nylon netting bag that can be loaded with materials simulating the natural substrate on which it lies. A rim around the top helps

retain the substrate material. When lowered to the bottom, the basket sampler collapses to form a substrate area that is eventually colonized. When the basket is raised off the bottom, the basket extends to its original hemispherical shape, and the surrounding net bag prevents the loss of invertebrates during retrieval.

6. Precautions

6.1 Samplers and floats may be difficult to anchor; they may be a navigation hazard.

6.2 Samplers are susceptible to vandalism and often lost.

6.3 Recovery techniques are critical for ensuring the collection of all organisms retrieved in the sampler.

6.4 Caution should be exercised in the reuse of samplers that may be subjected to contamination by toxicants, chemicals, oils, etc.

7. Procedures

7.1 In deep water, three basket samplers are suspended from floats, cement structures, or rods driven into the stream-bed or