

ADOPT-A-STREAM MONITORING EQUIPMENT BUILDING INSTRUCTIONS BENTHIC MACROINVERTEBRATE SAMPLING

THE SURBER SQUARE FOOT SAMPLER

The Surber is a standard device for collecting macroinvertebrates from stream bottoms. It is a net-frame combination that is placed facing upstream in a riffle. The frame is set on the stream bottom and all the rocks and sediments within it are rubbed or brushed to clean them of their benthic inhabitants. These organisms are then washed into the net by the current of the stream. This Surber design uses a combination brass, aluminum, and steel frame for maximum rust prevention and sturdy construction. Making it requires some metal working skills and some sewing skills.

Materials

9	Aluminum flat stock	1" x 3/16" x 96"
8	Right angle corner braces	3/4" wide
32	Aluminum bolts	1/4" x 1/2"
32	Aluminum nuts for bolts	1/4"
2	Aluminum bolts	1/4" x 1"
4	Nuts for above	1/4"
2	Brass hinges (open width not more than 2")	
12	Brass nuts and bolts for hinges	
1	Small can with plastic top	3" diameter x 5"
1	hose clamp	3" diameter
	fiberglass window screening or mosquito netting	26" x 104"
	Heavy canvas	50" x 8"
	Seam binding	1" wide x 8" long
	Rust proofing paint	

Tools:

Hacksaw
Screwdriver
Pliers
Heavy fabric scissors
Second grade flat file
Electric hand drill or drill
press with 1/4" and 3/16" bits

Sewing machine
Paint brush

PART !: Building Instructions for the frame

1. Cut eight 1' lengths of the aluminum and one 10" piece. Bolt the eight pieces together to form two squares, each 1' square. One of these squares will sit on the bottom; the other will be mounted at right angles to the first to hold the net. The squares will be hinged together so that they can be folded flat. The ninth piece of aluminum will be a brace to hold the two frames open.
2. Mount right angle "L" braces in the eight corners of the two frames to make sturdy joints. Position these braces one at a time in the corners and drill the four holes to mount them. Use the aluminum nuts and bolts to secure them.
3. Mount the hinges between the two square frames so that they can fold perfectly flat, one right on top of the other. Do not tighten the bolts tightly; they will need to be removed later.

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4. Put a notch or slot 1/4" wide and 1/2" deep in the 10" brace piece in one of the long sides, about 1/4" from an end. Drill a 1/4" hole 1/4" from the other end. Mount this piece on one side of the upright frame with a bolt and two nuts locked together so that the brace can rotate around it. The brace locks onto the lower frame by means of the notch, fitting over a 1/4" bolt sticking out from the side of the frame.
5. Drill a 1/4" hole about 5" up from the bottom on one side of the upright frame. Mount the brace with the 1/4" hole. Set the frames up so that there is a right angle between them. Swing the brace around so that its free end lies next to the side of the lower frame. Mark the point on this frame that is inside the notch in the brace. Drill a 1/4" hole there, stick the bolt through it, and mount it with one nut outside the frame and one nut inside. Adjust the bolt so that about 1/2" of it protrudes outside the frame. The brace notch should be able to hook onto this and hold the two frames open at right angles.
6. Paint all the pieces that could rust.

PART II: Building Instructions for the net

1. Cut four pieces of fiberglass window screening, each measuring 13" x 26". Measure in 2 1/2" from the edge on one of the 13" sides of each piece. Draw a line.
2. From either edge of the piece on this line, cut a straight line running to the far edge, meeting in the middle of the opposite edge. In other words, you will have cut four pieces of screening that are almost triangles with bases of 13", and heights of 23 1/2", but you have rectangles which measure 13" long and 2 1/2" wide below the base of each triangle (see the figure on the next page).
3. Sew two of these pieces together with a 1/2" seam along one side.
4. Sew on the third and fourth pieces just as you did the second.
5. Make the canvas frame cover before the last seam is sewn, closing the net. Fold the pieces of canvas in half (width-wise) so that you have a double piece measuring 4" x 50". Sew a double row of stitches the whole length of the canvas, 1 1/2" from the fold. You should have a 1 1/2" tube with two 2 1/2" extra flaps protruding.
6. Place the 2 1/2" rectangles on each of the four sections of the net between the two flaps. Double sew the flaps and net together.
7. Remove the hinges and brace and slide the tube over the frame.
8. Start from the pointed end and sew up the last side as far as possible with the sewing machine. Sew the rest by hand.

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9. Cut the pointed end off the net so that a hole about 3 1/2" in diameter is left. Sew a piece of seam binding around the inside and outside of this hole to finish off this end and the seams of the netting.
10. Cut out the bottom of the can and paint it so it won't rust. Allow it to dry.
11. Stick the painted can into the opening in the end of the net, and fasten it with the hose clamp.
12. Cut small holes in the canvas so that the hinges and brace can be put back on this upper frame that has the netting on it.
13. Fold the Surber Sampler up into a flat unit for easy storage.

