

# A drop net for catching shorebirds

Leonard J. Peyton and Gerald F. Shields



Catching large numbers of shorebirds with mist nets is often difficult. Standard mist nets are seldom efficient in exposed areas where shorebirds congregate to feed. Additionally, these areas can be subjected to persistent winds and standard mist nets do not work well under windy conditions.

While working on an ecological study at the mouth of the Inglutalik River, near Koyuk, Norton Bay, Alaska, we were faced with the problem of catching and marking the breeding, non-breeding, post-breeding, and migratory shorebirds in the area. A paper by J.E. Johns (1963) presented the idea of using the mist net as a drop net. Utilizing John's idea we constructed a 32 ft by 45 ft drop net by stretching and interlacing four 7 ft x 42 ft, 50 d/2 ply 1½ in. mesh mist nets together. We wind-proofed this net and then mounted it on a stationary set of posts over a mud flat that was being used heavily by feeding shorebirds. During its initial use the net proved very effective in catching shorebirds and the wind had very little effect on its operation.

The shorebirds captured under the drop net were Common Snipe (*Capella gallinago*), Least Sandpiper (*Calidris minutilla*), Dunlin (*Calidris alpina*), Semipalmated Sandpiper (*Calidris pusilla*), Western Sandpiper (*Calidris mauri*), Long-billed Dowitcher (*Limnodromus scolopaceus*) and Northern Phalarope (*Lobipes lobatus*).

The shorebirds captured under the drop net constructed with 1½ in mesh netting were able to push their folded wings through a single mesh, making it difficult and time-consuming to extract them. We suggest that a large net of smaller mesh (1 in.) and also constructed of heavier material (110 d/2 ply) would improve the operators' ability to capture and band more birds per unit time and lessen chances of injury to the birds. We have not tested this modified version.

The following is a detailed description of the construction and installation of a large drop net using four 7 ft x 42 ft, 50 d/2 ply, 1½ in. mesh, 4-panel, mist nets without the top windproofing tethers.

**Note:** Top-tethered nets may be used, but the tethered trammel line is difficult to remove.

## Net construction

### Preparing nets

Assemble the needed supplies as listed in the Appendix. Find a wall that is about 50 feet in length, suitable for hanging the nets. Unfold one of the nets, place pieces of 1 in. masking tape through the top attachment loops and stretch and tape the top line of the net near the top of the wall. Attach tape to the next three attachment loops on each end of the net. Stretch and tape these to the wall so that the net is bunched near the top of the wall. Leave the bottom loop on each end free.

In the same manner, tape the second net to the lower part of the wall, leaving the top attachment loops free. Bring the bottom line of the top net and the top line of the bottom net together, stretch them tightly and tape them to the wall at a convenient height.

Trammel lines are the heavy black lines which are fastened to the attachment loops and support the netting when the net is set up to catch birds. These must be replaced because they are not long enough to allow a net to be stretched to its full length. (Do not remove an original trammel line until you have installed a new line. These original trammel lines act as guides for the installation of the new lines and hold the netting in place while the new lines are being interwoven into the netting.) The 20 lb black braided casting line replaces the original trammel lines. This line is available on 50 yard spools with the line continuing from one spool to the next. Do not cut these spools apart.

### Interlacing nets

Obtain an empty cardboard box, poke a hole in each side of the box opposite each other, and poke a ⅜ in. doweling through one side of the box. Place the group of casting line spools on the dowel, and push the doweling out the hole in the other side of the box. This will allow you to pull the line off the spools as it is needed without causing undue tangles.

Place this box containing the mounted spools of casting line at the right end of the nets. Thread the

end of the braided casting line through the eye of the sack needle and start lacing the two nets together, starting with the first loop of mesh in the bottom right-hand corner of the top net. The needle is then passed through the first loop of mesh in the top right-hand corner of the bottom net, then back to the next loop in the top net, then back to the next loop in the bottom net, etc., until the two nets are interlaced (Figure 1). This will go very quickly if the two trammel lines are very close to each other and you pass the needle through the mesh in the same direction as the trammel lines.

After the two nets are interlaced, pull an extra 5 to 6 ft of the new trammel line through on the left-hand side of the nets. Cut this line just before it enters the netting on the right side and tie it to one of the existing attachment loops that is taped to the wall at this point. Cut one of the attachment loops free of the old trammel lines on the left side of the net and tie the new trammel line to it at least 4 ft out from the left-hand side of the netting (you will need this extra line when you stretch the net). Stretch the new trammel line tightly and tape the attachment loop to the wall. Cut the old trammel lines loose and remove them from the netting.

Move the two interlaced nets to the top of the wall by pulling the tape loose and moving them up. Tape another net to the lower part of the wall and interlace it with the bottom edge of the second net following the instructions given above. This procedure is followed until all four nets are interlaced.

No two mist nets are likely to be the same length, so the left-hand side of the netting must be

trimmed to the length of the shortest net in order to have a straight-edged rectangular net.

The three old interior trammel lines of each of the four nets are then replaced with the new 20 lb test black braided casting line. Do not at this point replace the top or bottom trammel lines of the combined nets. Thread the end of the casting line through the eye of the sack needle, then pass the needle through the smaller loop of an attachment loop and, using the sack needle, weave the braided casting line (new trammel line) through the mesh, following the path of the corresponding old trammel line.

Pull an additional 5 to 6 ft of new trammel line through to the left side of the net, to correspond with the length of the new trammel lines that were used to lace the four nets together. Cut the casting line (new trammel line) just before it passes through the attachment loop on the right-hand side of the net and tie it to the attachment loop. Then cut the old trammel line loose from the attachment loops on both sides of the net and pull it out of the netting. Move the attachment loop on the left side of the net out so that it is taped to the wall (even with the attachment loops that are attached to the trammel lines used to lace the four nets together). Pass the end of the new trammel line through this attachment loop, pull it tightly and tie it to this attachment loop. Following this procedure, continue to replace the old trammel lines until all but the top and bottom trammel lines are replaced. These two trammel lines are replaced with the binding rope for the drop net. Cut and remove the vertical spacing lines on both ends of the net. This will allow the net to be stretched to its full width (about 18 in. per panel).

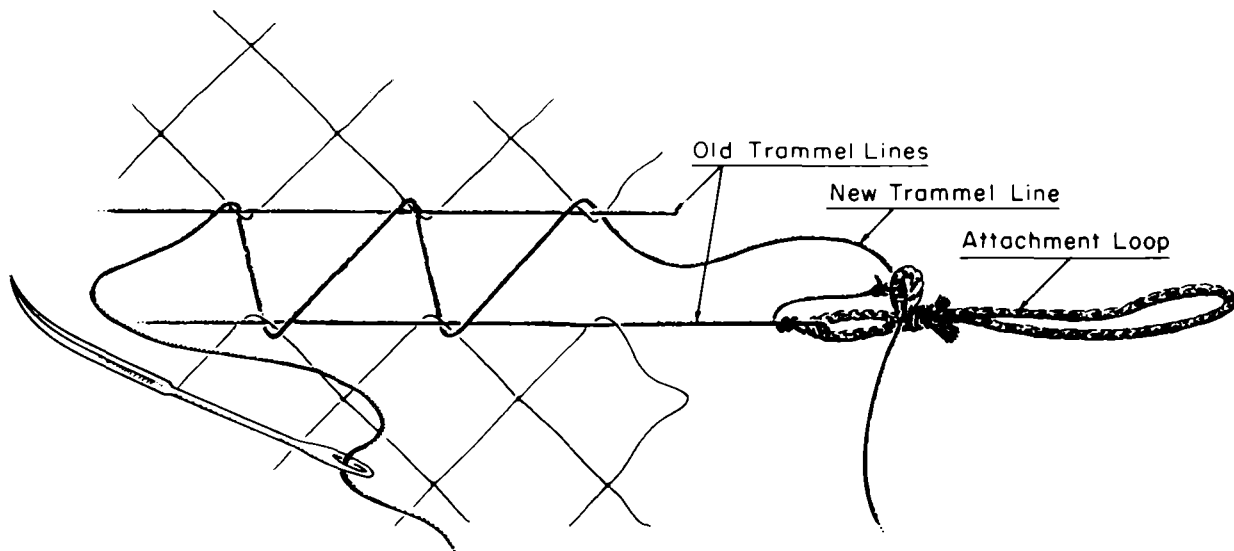


Figure 1. Interlacing of two mist nets.



Figure 2. A 5-lb lead ingot ready for installation.

### Binding net

Mount the spool of  $\frac{1}{8}$  in. (dyed black) braided nylon rope on a piece of doweling in an empty cardboard box. Place the box on the right side of the net, pull the rope up and through the *attachment loop* at the top right-hand corner of the net, then interweave the rope through the top row of mesh loops following the top trammel line. This is usually somewhat difficult as the netting catches on the rope, making it necessary to free the net carefully. When pulling the rope through the edge of the net, remember to leave enough slack (about 6 ft) at each corner to allow (1) the net to be stretched, and (2) a 2 in. loop to be tied in the rope at each corner of the net.

After the rope has been pulled through the top row of mesh loops, run the rope through the upper left-hand attachment loop and interweave it down through the outside row of mesh loops on the left side of the net. The rope then goes through the bottom left attachment loop before it is pulled through the bottom row of mesh loops. The same procedure is followed in running the rope up through the outside row of mesh loops on the right side of the net.

The net is then taken down, the top and bottom trammel lines cut so that the net can be stretched, and the rope adjusted into its proper position with

respect to the sides and ends of the net. The best place to stretch the net would be a gymnasium floor or some other large, smooth area. The net could be stretched in the air in a horizontal position, but this would be more difficult. While the net is stretched out on the floor, put a 2 in. diameter eyelet loop in each corner by making a loop in the  $\frac{1}{8}$  in. binding rope and whipping the base of the loop together with the medium weight nylon string. The ends of the binding rope are tied together by making a loop in the end of each rope and whipping the bases of the two loops together. As nylon string does not stay tied and tends to loosen with use, it is best to put some "Duco"-type cement on these knots. Tie the trammel lines tightly to the binding rope on what was the right side of the net, then tie these same trammel lines loosely to the left side of the net. Do not remove the attachment loops!

### Wind proofing

Measure the width of the net, then hang the net back on the wall with the top of the net being about head high and the majority of the netting being bunched near the bottom of the wall. Using the width of the net and adding about 18 in. for working material, cut enough lengths of the 20 lb black braided nylon casting line to run a line the width of

the net every 18 in. along its length. Tie a length of the casting line to the 1/8 in. binding rope along the top edge of the net at each 18 in. interval. Interweave these lengths of casting line down through the netting following the knot line in the netting that corresponds to the locations where the line is tied to the binding rope. The quickest way to do this is to thread all of these lines through the top couple of tiers of net, move the net up, thread all of the lines through the next two or three tiers of netting, then move the net up again until all the lines have been interwoven through the net. Tie the ends of these lines to the binding rope along the bottom edge of the net, so that they will not pull out of the netting when you move the net.

Remove the net from the wall and stretch it out horizontally between four posts. With the net tight, untie the cross lines from what was the bottom edge of the net and the trammel lines on the left-hand side of the net, shorten them until they take some slack out of the netting, tie them back on the binding rope and put a dab of "Duco"-type cement on the knot.

Hang the net back on the wall with the top edge a little above head height. Put Duco cement on all of the knots along the top edge of the net. Using the black carpet weight nylon thread, tie the 20 lb casting lines together wherever they cross. Put a small dab of cement on each of these knots. Move the net up the wall tying as you go until this project is complete. This procedure divides the net into 18 in. squares and gives it the stability needed for windy conditions.

Bring all of the netting together at about shoulder height. Using short lengths of a heavy white string, wrap it around the net at about every 6 ft and tie it in a bow knot. Carefully remove the attachment loops from the net by cutting the braided casting line near the binding rope. Be sure that you have put a dab of cement on these knots. Put the net into a large plastic bag, and it is ready to take into the field.

### Weights

Four 5-lb lead ingots are used as corner weights to pull the net down and hold it in place when it is dropped. To prepare the lead ingots for use, drill three pilot holes in each: one in the top center, one on a side centered near the base of the ingot, and the third in the same location on the opposite side. Screw the heavy-duty screweyes into the lead ingots with care. Screweyes can be broken if too much pressure is exerted on them (see Figure 2). A swiveled snap hook is then fastened to one of the side-mounted screweyes on each ingot. This hook

attaches to the corner loops of the 1/8 in. braided line that binds the edge of the drop net.

The screweyes and snaphooks rust very quickly when used in the wet conditions where shorebirds feed. We recommend using stainless steel screweyes and snaphooks.

### Mounting posts

The site for the drop net is selected and cleared of all items that might become entangled in the netting. The net is then spread out on the area and holes dug into the ground about 12 in. out from each corner of the net. These holes should be about 2 ft deep. Four 6-foot-long posts, about 3 to 4 in. in diameter are then set into these holes. (**Note:** Be sure you tamp the mud back into these holes around the posts as firmly as possible.) These posts are then guyed to help hold them in place. Guying should be placed to hold the post away from the net and to keep the post from being pulled towards the drop point (Figure 3A).

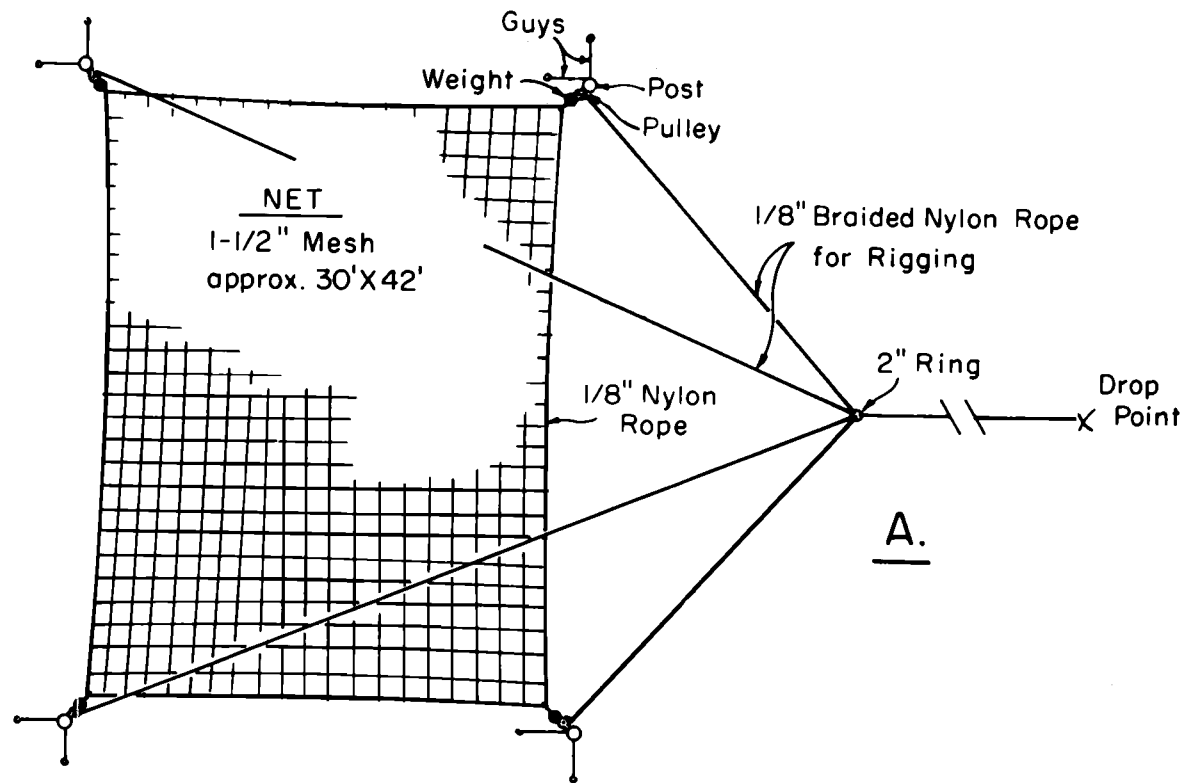
A 1/8 in. swivel pulley is then attached to the top of each post by wrapping wire around the top of the post and through the eye of the pulley. A piece of 1/8 in. nylon rope is then mounted vertically on the post as a guide line for the falling net. It should be tied tightly around the post at the mud line, then run through the screw eye on the side of the lead weight opposite the one that has the swiveled snap hook attached to it, then to the top of the post where it is pulled up tightly and tied securely. This line keeps the net tight as it is dropped (see Figure 3B).

### Rigging

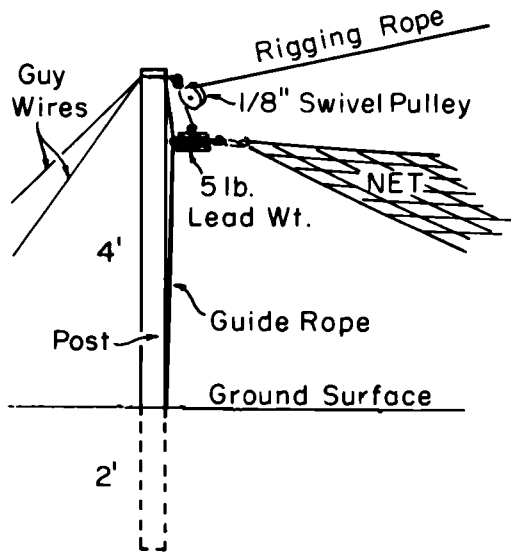
Four lengths of the 1/8 in. black braided nylon rope are then installed. Each length of rope is fastened to the top screweye of a lead weight, then up through the 1/8 in. pulleys that are fastened to the top of the corner posts, and onto a central ring located about 20 feet from the edge of the net towards the selected drop point. A single piece of 1/8 in. nylon rope then extends from the ring back to the drop point located about 100 ft from the net (see Figure 3A).

The drop line is then pulled tightly and looped over a stake that has been driven into the soil. The lines from the ring to the individual lead weights are then adjusted so that when the drop lines are tight all four lead weights are at the top of the posts. The net can then be clipped to the weights and be ready for use.

After the net is dropped, it is easy to unhook the



B.



C.

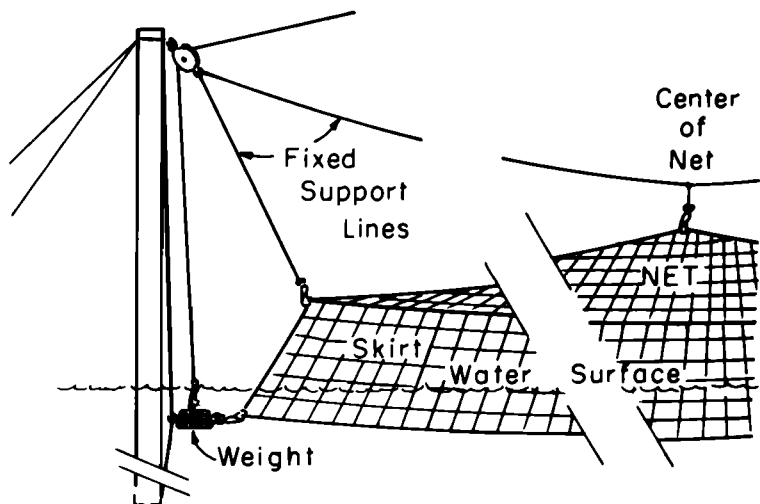


Figure 3. A. Top view of erected net ready to drop.  
 B. Detail of corner post rigging  
 C. Suggested modification for use over water.

net from the weights, fold it back, and remove the birds from underneath. **Note:** Weights were not attached to the rope that binds the edge of the net because of the tangle problems that would be encountered when folding the net back in order to remove trapped birds.


### Modification for use over water

The design of this net limits its use to mud flats or sandy beaches where there is very little standing water. If water is present, the birds caught under the net would drown very quickly. We suggest that a drop net for use over shallow water can be made by putting a 12 in. skirt of netting around the outside perimeter of the net and rigging it to drop like a tent (see Figure 3C). Additional rigging from the corner posts would have to be added to keep the top of the drop net from collapsing onto the water. After a successful drop of the net, the operators could remove the entrapped birds from under the net by driving the birds to one side and unhooking and lowering the near side of the net into the water and moving the netting towards the center, then repeating the operation on the other side of the net. This would concentrate the birds in the center of the net, where the operators should be able to lift the net, capture, and remove the birds easily.

### Acknowledgments

We wish to thank George C. West for his constructive criticisms on the manuscript and for his helpful suggestions on the presentation of construction techniques.

The development of this net was supported in part by the Bureau of Land Management through interagency agreement with the National Oceanic and Atmospheric Administration, and managed by

the Outer Continental Shelf Environmental Assessment Program Office. 

### Reference

John, J.E. 1963. A new method of capture utilizing the mist net. *Bird-Banding* 34:209-213.

*Institute of Arctic Biology, University of Alaska, Fairbanks, AK 99701.*

Appendix		Supply list
Quantity		Supplies
4	7 ft. x 42 ft., 50 d/2 ply, 1 1/2" mesh 4-panel mist nets (Alternatively—1" mesh 110 d/2 ply black nylon netting)*	
1	300 ft. spool of 1/8" braided nylon rope**	
15	50-yard spools of 20 lb. test black braided casting lines	
1	small spool of medium weight nylon string	
1	large spool of black nylon thread, carpet weight	
2	rolls of 1" masking tape	
1	pkg. of black dye for nylon cloth	
4	1/8" swivel pulleys (stainless steel)	
4	5 lb. lead ingot	
12	screw eyes (heavy duty with 3/16" eyelet hole) (stainless steel)	
1	ring 3/16" or 1/4" stock 2" in diameter (stainless steel)	
1	tube of "Duco" type cement	
1	piece of 3/8" wooden doweling	
1	sack needle	

\*This netting can only be obtained by placing a special order through a mist net supplier. A special order placed with the Bleitz Wildlife Foundation in 1977 for 500' of 1" stretched mesh 110 d/2 ply nylon webbing 400 meshes wide took 8 months to arrive. A recent communication indicated that there is a current three to four month delivery time.

\*\*The 1/8" white braided nylon rope must be dyed black before it can be used as the binding rope for the net. To do this, remove the whole 300 feet from the spool and place it in a large kettle, cover it with the dye and follow directions on the dye package. Take the rope out of the kettle, dry it well, and rewind it on the spool on which it originally came.