

Jones-Davis Bycatch Reduction Device

DESCRIPTION

The Jones-Davis Bycatch Reduction Device (BRD) is a funnel-style BRD shown to reduce bycatch by 58 percent by weight and retain 96 percent of shrimp in the net. There are two components to the BRD: the funnel and the fish-deflection cone. (Figure 1)

The Jones-Davis BRD extension uses two hoops sewn into the netting to first support the funnel and escape windows and second, anchor the cone in place. Four escape windows are cut into the side of the extension. The funnel is sewn from four pieces of netting. It is attached near the leading edge and exits just behind the first of the two hoops. The cone is two triangular pieces of netting and a cable hoop installed behind the funnel and held by two anchor lines at the second hoop.

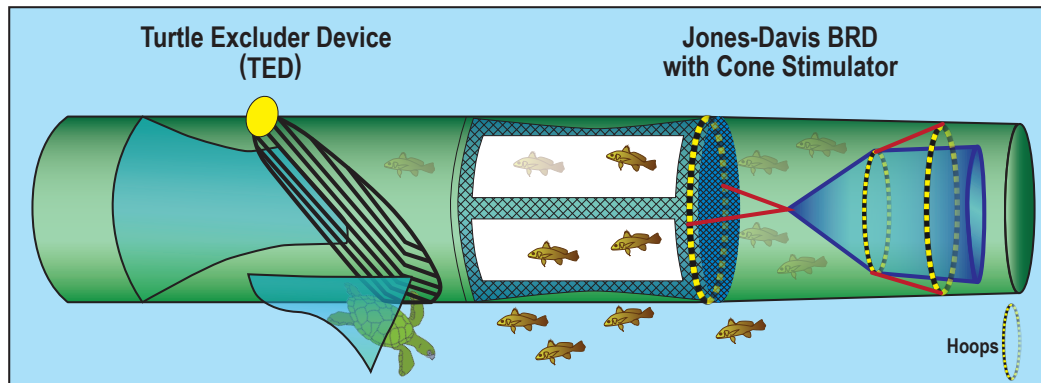


Figure 1. Entire Jones-Davis BRD as seen from the side, behind the TED. Top or bottom shooting TED is appropriate.

CONSTRUCTION AND INSTALLATION

Step 1: Construction of the BRD Extension

The BRD extension is a single piece of 1-5/8-inch (41 mm) netting measuring 42 meshes by 120 meshes. Choose a 120-mesh side to be the leading edge. See Figure 2.

Step 2: Cut the Escape Openings

From the top left corner, count 16 meshes along the leading edge. Start the first escape window by cutting 10 meshes on an even row, 3 meshes inward of the leading edge. Turn 90 degrees and cut 13 meshes back from both ends of the first (10 mesh) cut. Finally, cut the back 10-mesh edge. The second opening starts 6 meshes to the right with the same dimensions.

The second set of openings start 16 meshes from the top right corner and 3 meshes from the leading edge. Cut 10 meshes on an even row to the left, turn 90 degrees and cut 13 meshes back from both ends of the first cut. Finally, cut the back 10-mesh edge. At 6 meshes to the left, start the next opening.

There should be four escape openings total, two on either side of the funnel, when finished. Double selvedge escape openings for strength.

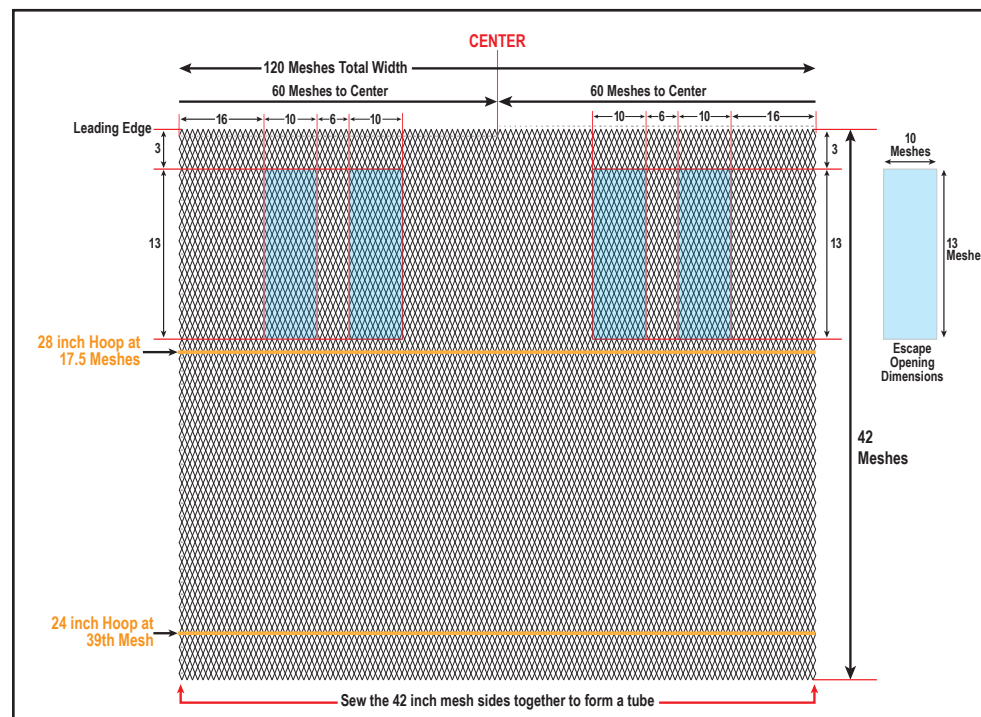


Figure 2. Construction details of the BRD extension with dimensions and placement of the four escape openings (Step 2) and position of the 28 inch and 24 inch hoops (Step 4).

Step 3: Sew Sides Together to Make a Cylinder

Sew the 42-mesh edges together to create a tube. The seam is the top of the BRD extension. See Figure 3.

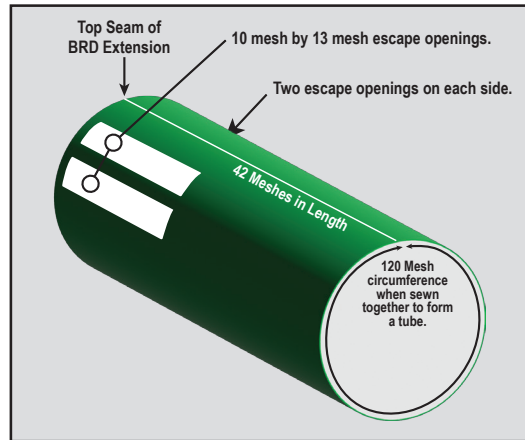


Figure 3. When the 42 mesh sides of the netting in Step 1 are sewn together it will form a tube that is 120 meshes in circumference.

Step 4: Constructing and Installing the Cable Hoops

28-inch hoop. An 88-inch-long steel cable (minimum 1/2-inch) is joined at the ends with a (minimum 1/2-inch) 3 inch length aluminum pipe. The pipe is pressed with a 3/8-inch die. The inside diameter of this hoop is between 27-29 inches.

To attach, count 17.5 meshes behind the leading edge (this should be behind the escape windows. Figure 2). Anchor the hoop at four places to hold position. Attach every other mesh all around the hoop using a minimum #24 twine. The hoop is then laced with 3/8-inch polypropylene or polyethylene rope for chafing (Figure 4).

24-inch hoop. A 75-inch-long steel cable (minimum 3/8 inch) is joined at the ends with a 3-inch piece of 3/8 inch aluminum pipe and pressed together with a 1/4 inch die. The inside diameter of this hoop is between 23-25 inches.

At 39 meshes behind the leading edge (see Figure 2), anchor the hoop at four places to hold position. Attach every other mesh all around the hoop using a minimum #24 twine. The hoop is then laced with 3/8-inch polypropylene or polyethylene rope for chafing (Figure 4).

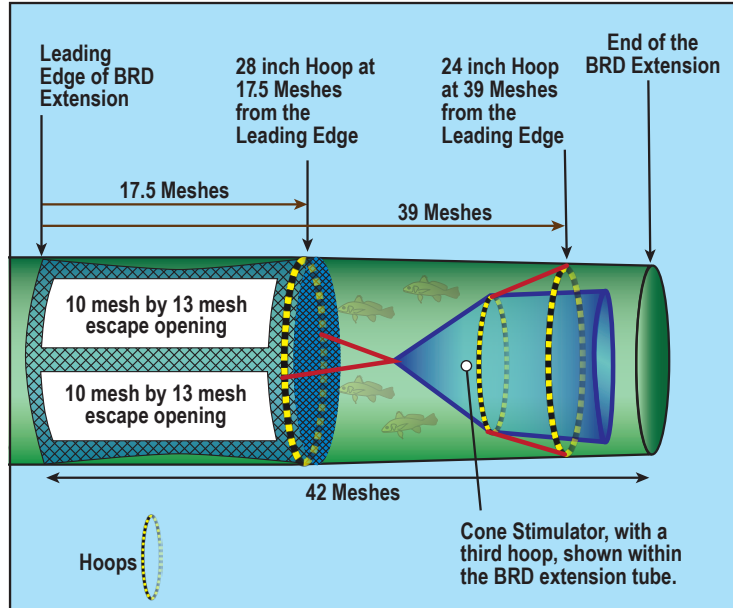


Figure 4. Placement of the 28 inch and 24 inch cable hoops within the BRD extension tube. A third hoop will be installed later into the Cone Stimulator.

OR

24-inch alternative. Lace an 80-inch-long #60 twine in and out of the extension netting 39 meshes behind the leading edge and tie together at the ends. The twine hoop is then laced with 3/8-inch polypropylene or polyethylene rope for chafing.

Step 5: Funnel Construction

The funnel is constructed from four pieces of 1.5-inch heat-set and depth-stretched polypropylene or polyethylene netting 29.5 meshes on leading edge by 23 meshes deep. See Figure 5.

Trim two pieces to form the top and bottom of the funnel. For the top piece, cut on a taper of 1 point and 2 bar from the leading edge (29.5 meshes) to the rear edge for both sides. This should create an 8-mesh rear edge once finished. Repeat instructions for the bottom piece.

Face all four leading edges (29.5-mesh side) in the same direction. Sew the top piece and one side piece together on the 23-mesh edge. Sew the other side piece on the other 23-mesh side. Finally, sew the bottom piece to both 23-mesh sides to create the funnel.

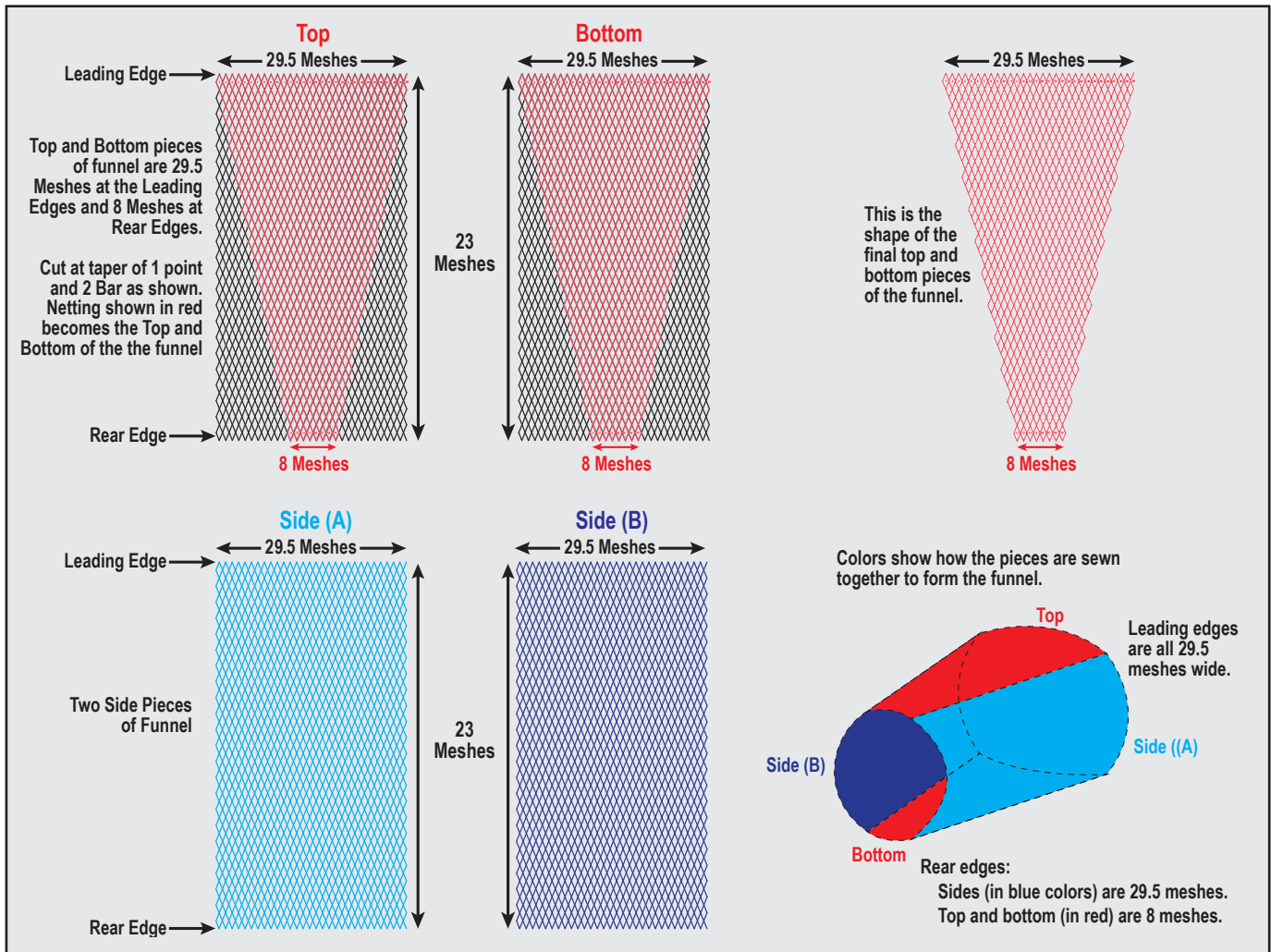


Figure 5. The funnel is constructed of four pieces of netting, cut and sewn together as shown.

Find the top-center seam of the BRD extension. See Figure 6. Inside the extension, center the leading edge of the funnel's top panel on the seam. At 2 meshes from the extension's leading edge, sew entirely the leading edge of the funnel into the netting. It should fit evenly on a 120-mesh extension.

The bottom-panel rear edge attachment is the same as the top. Count 60 meshes around from the top-center seam (on the 120-mesh extension) to find the bottom-center. Attach the rear edge 1 mesh behind the hoop with 4 meshes on either side of center.

The diagram illustrates the construction of a 42-inch mesh escape opening. The main structure is a rectangular mesh with a total width of 120 meshes and a total height of 42 meshes. The width is divided into sections: 16 meshes on the far left and right, and 10, 6, and 10 meshes in the center sections. The height is divided into a top section of 13 meshes and a bottom section of 29 meshes. The top section features a central triangular mesh pattern and two vertical rectangular mesh patterns on either side. The bottom section is a solid rectangular mesh. The diagram includes labels for the 'Leading Edge', 'CENTER', and 'Sew the 42 inch mesh sides together to form a tube'. A separate inset shows the 'Escape Opening Dimensions' as a 10-mesh wide by 13-mesh high rectangle.

120 Meshes Total Width

60 Meshes to Center

60 Meshes to Center

Leading Edge

3

2

16

10

6

10

10

6

10

16

3

13

28 inch Hoop at 17.5 Meshes

42 Meshes

24 inch Hoop at 39th Mesh

Sew the 42 inch mesh sides together to form a tube

10 Meshes

13 Meshes

Escape Opening Dimensions

Figure 6. Install the funnel 2 Meshes from Leading Edge centered and through the 28 inch Hoop and attach the 8 Mesh rear edge 1 Mesh behind the Hoop.

Step 7: Cone Construction

The cone is constructed of two pieces of 1-5/8-inch (41 mm) polypropylene or polyethylene netting, 40 meshes wide by 20 meshes in length. Cut the 20-mesh sides evenly along the bar to create a triangle. Starting at the point, sew the two triangles together on the sides and leave the 40-mesh base open. See Figure 7.

Construct a hoop using 5/16-inch (8 mm) or 3/8 inch (9.5mm) cable that is 34.5 inches (88 mm) in length and join it at the ends with a 3-inch aluminum pipe (3/8 inch, 9.5 mm) pressed with a 1/4-inch (6.4 mm) die. The hoop is attached with heavy twine inside the netting cone at 10 meshes from the point.

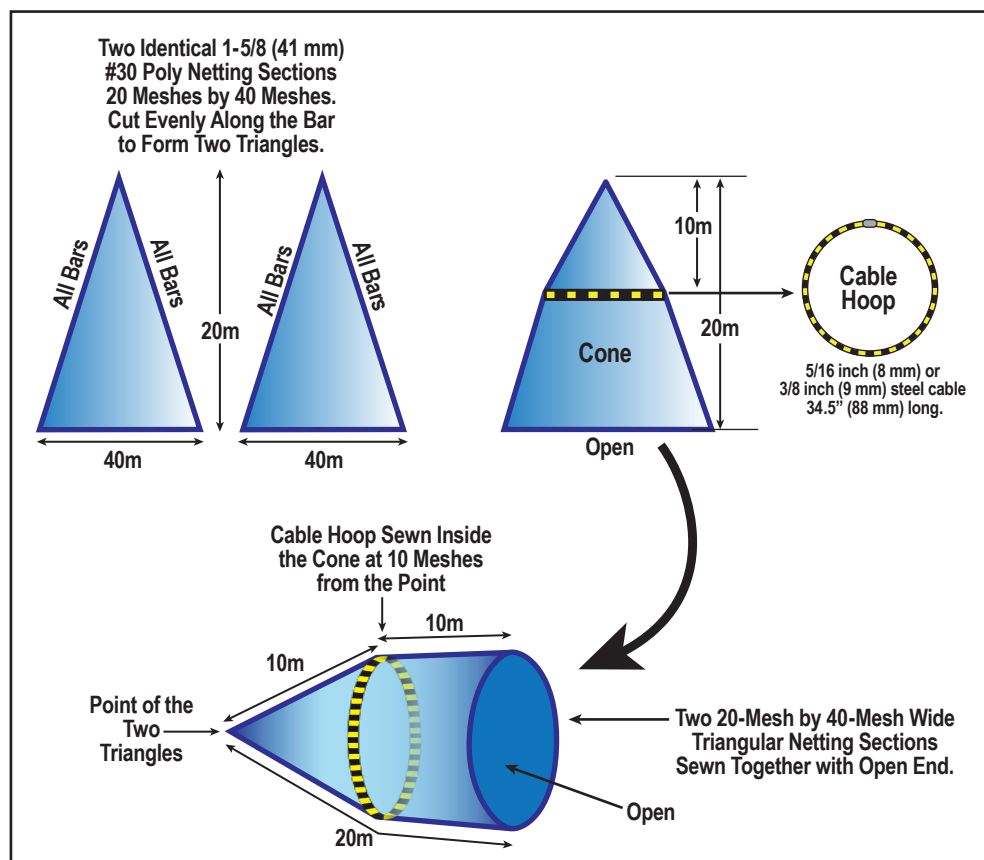


Figure 7. Details of cone construction.

Step 8: Cone Installation

The cone tip must be 12 inches (30.5 cm) or less behind the back edge of the funnel, and the cone attached in four places. See Figure 8.

Cut a 4-foot (1.22 m) piece of #60 twine. Find the midpoint of the twine and attach it to the cone tip. Attach the ends of the twine to the 28-inch hoop at the center of each side (~30 meshes from the top seam).

To secure the cone, attach two 8-inch pieces of twine to the top and bottom of the cone hoop. The opposite ends of the twine are attached top and bottom to the 24-inch hoop.

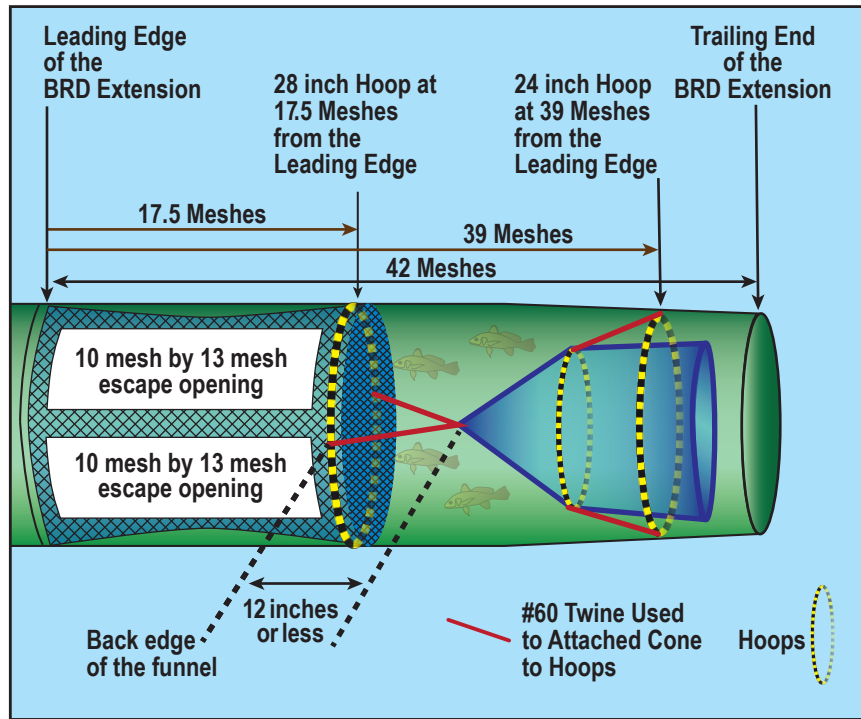


Figure 8. Install the cone with #60 twine (red lines in this illustration) with the tip 12 inches or less behind the back edge of the funnel.

Step 9: Connect to TED Extension

The Jones-Davis BRD connects to the TED extension no more than 4 meshes from the back edge of the TED grid (top or bottom shooting). Remove excess TED extension netting on an even row. Attach the BRD extension so the seam is located on the top of the trawl when towing. Escape windows should be no more than 18 inches from the back edge of the TED grid. Complete the installation by attaching the codend (bag) to the trailing edge of the BRD extension making sure the cone can move within the net.

Alternative Method to Constructing Funnel and Escape Openings

With this alternative method, the funnel and escape openings are formed by cutting a flap in each side of the BRD extension netting, pushing the flaps inward and attaching the top and bottom edges along the bars to form a V-shape.

Minimum Requirements:

- 1.) The funnel's top and bottom edges must be attached one mesh behind the 28-inch hoop
- 2.) Clearance between the side of the funnel and the 28-inch hoop must be at least 6 inches
- 3.) The leading edge of the escape openings must be within 18 inches of the posterior edge of the TED grid
- 4.) The area of the escape opening must total at least 864 inches².

Construction:

Step 1. Create Funnel Flaps

With a closed (42-mesh sides sewn together) BRD extension, count over 18 meshes from the top seam on both sides and cut 13 meshes to the back of the extension. Turn parallel to the leading edge (90 degrees) and cut 26 meshes toward the bottom center. Turn back (90 degrees) parallel to the top-center seam and cut 13 meshes. You should have a flap.

Step 2. Extend Funnel Flaps

Lengthen the flap by attaching a 4.5 mesh by 26 mesh rectangular netting piece to the 26-mesh edge.

Step 3. Create Funnel

Attach the 18-mesh edges to the top and bottom of the BRD extension by sewing 2 bars of the extension to 1 mesh of the flap toward the top-center and bottom-center of the extension. This creates the funnel and clears the escape window opening. Remember the funnel edges will be attached one mesh behind the 28 inch hoop.

Step 4. Create Clearance

Connect the two flaps together in the center with a 7-inch piece of #42 twine to allow adequate clearance for fish escapement between the flaps and the side openings (minimum 6 inches).

Step 5. Finish Escape Windows

On each side, sew a 6-mesh by 10.5 mesh netting section in the center of the escape window created by the mesh flap. This should form two 10 by 14 mesh escape openings on each side.

Step 6. Attach Hoops, Cone, and Attach to TED

Follow previous directions to attach cable hoops and cone to complete the BRD.

CONTACT US

Sea Grant:

Matthew Kammann
mkammann@tamu.edu
(361) 825-6216

Tiffany Pasco
tpasco1@lsu.edu
(859) 321-2492

NOAA Southeast Fisheries Science Center Gear Research Branch:

Blake Price
blake.price@noaa.gov
(228) 369-8194

Daniel Foster
daniel.g.foster@noaa.gov
(228) 549-1763

For more information on the project, please visit
www.laseagrant.org/outreach/projects/better-brds/

This document was prepared for general informational purposes in October 2022 and has no legal force or effect. Please refer to the federal BRD regulations, 50 CFR part 622 and 622 Appendix D and the Federal Register for specific and controlling BRD requirements.

