4 Seam, 3 Bridle Survey Bottom Trawl Specifications

Northeast Fisheries Science Center

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DRAFT
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12 cm Webbing

319.5 mesh

100.5 mesh deep

Port/Starboard Top Wing

Port/Starboard Bottom Wing

Port/Starboard Side Panel 1

Port/Starboard Side Panel 2

Port/Starboard Bunts

Bottom Belly 1
### 6cm Webbing

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<tr>
<th>Dimension</th>
<th>Description</th>
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<tr>
<td>1550 mesh</td>
<td></td>
<td></td>
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<tr>
<td>100.5 mesh deep</td>
<td></td>
<td></td>
</tr>
<tr>
<td>468.5</td>
<td>top/bottom belly 2</td>
<td></td>
</tr>
<tr>
<td>335.5</td>
<td>top/bottom belly 3</td>
<td></td>
</tr>
<tr>
<td>72.5</td>
<td>Port/starboard side panel 4</td>
<td></td>
</tr>
<tr>
<td>170.5</td>
<td>port/starboard side panel 3</td>
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<tr>
<td>283</td>
<td>top belly 1</td>
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</tr>
<tr>
<td>217.5</td>
<td>top/bottom tail piece</td>
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</tr>
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<td>242.5</td>
<td>top/bottom belly 4</td>
<td></td>
</tr>
<tr>
<td>37.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>323</td>
<td></td>
<td></td>
</tr>
<tr>
<td>35.5</td>
<td>square</td>
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Components of the Trawl

Trawl
- 4 seam
- 3 bridle
- 400 meshes x 12cm (knot center/knot center) = 4800cm
- Footrope = 2700cm
- Headrope = 2424 (including wing end extensions and shackles)

Twine Size and Thickness
- 12cm (kc), 4mm regular, dark green, braided polyethylene
  in top/bottom wings
  in bunts
  in 1st bottom belly
  in 1st and 2nd side panels
- 6cm (kc), 2.5mm regular, dark green, braided polyethylene
  in square
  in 2nd belly back to cod end
  in 3rd and 4th side panels

Section Joining Twine
- 12cm mesh sections joined together by Double 2.5mm Orange P.E.
- 6cm mesh sections joined together by single 2.5mm Orange P.E.
- 12cm mesh to 6cm mesh joined together by single 2.5mm Orange P.E.
- Selvedge joined to wing sections by single 4mm dark green, braided polyethylene.

Selvedge
- Selvedge will be cut from 12.0cm (kc), double 4mm dark green, braided polyethylene,
  Euroline with yellow tracer.
- 8 meshes deep on the bottom wing bars
- 5 meshes deep on the top wing bars
- 5.5 meshes deep across forward square
- 5.5 meshes deep across forward 1st side panel
- 2.5 meshes deep across forward 1st bottom belly
- All jibs (top, bottom and side).

Gores
- 4 full meshes will be put into each gore.
- Port Top= Orange 2.5mm P.E. & White #48 nylon.
- Port Bottom= Double Orange 2.5mm P.E.
- Starboard Top= Green 2.5mm poly & White #48 nylon.
- Starboard Bottom= Double Green 2.5mm P.E.
Hanging Lines
Hung using #96/108 white nylon twine.

Headrope
- ¾” stainless steel combination wire IWRC.
- ¾” stainless steel heavy wire rope thimbles
- ½” stainless steel wire.
- ½” stainless steel heavy wire rope thimbles.
- Headrope is 2058cm eye to eye
- The headrope eye, the top jib end meshes and the upper wing end eye are all put in a ¾” Blue Line bow shackle with the 174cm headrope extension of ½” s.s. wire coming from it.
- The headrope extension of ½” s.s. wire is 174cm.
- The total headrope length from eye to eye is 2424cm, including port/starboard ¾” bow shackles (9”) and 174cm, ½” s.s. wire, extensions.
- A ½” hammerlock goes on the end of the 174cm extension.
- 3 Nokalon #508, 8” center hole, orange trawl floats go on each 174cm extension separated by 4”x ½” rubber cookies.

Wing End (Up & Down Lines)
- 5/8” stainless steel combination wire IWRC
- 5/8” stainless steel HWR thimbles
- The upper wing end is 552cm eye to eye
- The lower wing end is 459cm eye to eye
- The top jib eye goes into the ¾” Blue Line bow shackle on the top
- The two side panel eyes and the middle jib end meshes are put into a ¾” Blue Line bow shackle with the middle extension coming from it
- The lower and middle extensions are made of 5/8” s.s. wire with 5/8” s.s. HWR thimbles. It is 133 cm - 9cm (3/4” bow shackle) = 124cm eye to eye.
- The lower wing end eye and lower jib end meshes are put into a 3/4” Blue Line bow shackle.
- A 5/8” hammerlock goes on the end of both the middle and lower 124cm extensions.

Floats
- 60 Nokalon #508, 8” center hole, orange trawl floats.
- The floats are mounted vertically in two 30-float strings, with the first float of each string starting 50cm from the center of the headrope
- Float line is made of ¾” polysteel blue, with orange tracer, float rope.
- The first 24 floats are mounted at 25cm on center and the remaining 6 floats are mounted at 50cm on center. All floats are mounted using white # 8 virgin polyester.
- 3 floats are put onto the port/starboard top wing end extensions.
Tailpiece
- Tailpiece diameter is 216 mesh across x 60 mesh depth of 6.0cm, 2.5mm
- 50, 3.5” plastic rings attached 20 meshes down to attach the codend.

Codend
- Codend is to be made from same material as the selvedge, 12.0cm (kc), double 4mm pe. Euroline..
- 100 meshes in diameter and 75 meshes deep, from 2 panels of 52x75 meshes.
- 6 meshes in each gore, 3 from each gore on both sides.
- The codend utilizes gore ropes, with 4 meshes on each side in the gore.
- Gore ropes are to have eyes spliced on forward and aft ends.
  Forward end- 14cm inside eye length. Aft End- 10cm inside eye length.
- At the aft end, the gore rope eye should be flush with the rings, at the forward trawl end, the gore rope should extend 70cm (including the 14cm eye).
- 33 zipper rings total. 32 3.5” plastic rings on the forward trawl end
- 1 center steel zipper ring, 3/8” x 3” stainless steel
- Codend zipper line made from 1/2” polydacron rope, 650cm length.
- 33 cod end puckering rings, 5/16” x 2.5” stainless steel rings at the terminus
- NO SPLITTING RINGS. The splitting strap will be attached by rope becket.
- Rope becket are 5/8” sampson, 200cm length. Attached 20 meshes from aft on each side of the codend.

Codend Ring Attachments
Codend rings are attached on the forward and aft sections by 8mm nylon. **The forward trawl end ring attachment:** First row is 1:1, with the six meshes in each gore taken as 1. Second row has one single mesh dead center in the top side and one single mesh dead center in the bottom side, for a total of two singles and the rest 2:1 on that row. The third row has 2 2:1's either side of the center mesh on the top side and then alternating 1:1 - 2:1 the rest of the row all the way around to the center for a total of 33 rings. The first two rows are 10cm bar length, the third row is 15cm bar length to facilitate the ring attachment.

**The aft ring end attachment:** The first two rows are the same as the forward rings, With 8 cm bar lengths. The third row has the 2:1's, either side of center, on the bottom side, making a single mesh in the middle. The top side, aft, should have a ring either side of center that should be seized together for the tripper to go into.

Chafing Mat
- 25L x 30W
- 6.0” kc, polyamide
- Sewn at 33 mesh from aft, on underside of cod end
- Seized on sides, each 7 meshes, using #8 nylon.
Bull Rope & Splitting Strap
- Bull rope made from 1-1/8” x 140’, 8 strand PE, Samson “Ultra Blue” braided. 8cm eye on one end of the bull rope.
- Bull rope eye connects to splitting strap eyes via 3/4” stainless steel opening pear shaped link.
- Splitting strap made from 1” x 25’ Tenex braided. 740cm eye to eye. Each eye is 8cm.

Bolschline (Rubberline): 3 Piece
- 2436cm total length outside eye to outside eye (including hammerlocks, 6cm each).
- 5/8” stainless steel wire.
- Center Section: 842cm outside eye/outside eye.
- Wing Sections: 791cm outside eye/outside eye.
- 2 3/8” spacer cookies cover wire. 4” cookies cover sockets.
- 198 Snowmen (2-hole hangers), center 76, wings 61.
- 1 link of 5/8” trawlex chain used as hangers to pass traveler through, spaced 60cm.
- 40 hangers total, 14 in center, 13 in each wing section.
- 2, 5/8” Crosby Hammerlocks connect 3 piece bolschline (6cm each).
- 5/8” Esco sockets swaged on each end of bolschline sections.
- 10 5/8” wire clamps total. 6 in center, 2 on each wing section.
Hanging Information

Twine Size- 12.0cm (knot center-knot center) 4mm Euroline, dark green, braided polyethylene. 
Selvedge/Jibs are 12.0cm (kc-kc) double 4mm Euroline.
Bars hung at 105%

**BOTTOM**
24 ROUND MESHES @ 6cm = 138cm
in 23 spaces
6, 1B1M @ 10cm = 60cm
9, 2B1M @ 16cm = 144cm
12 BUNT BARS @ 105% = 151cm
48 WING BARS @ 105% = 605cm
14.5 JIB BARS + ½ @ 105% = 189cm
TOTAL WEBBING = 2436cm
EXTENSION = 133cm [124cm E.T.E (5/8" s.s. wire) + 9cm (3/4" Bow shackle)]

TOTAL FOOTROPE = 2702cm (see bolschline drawing for details)

**TOP**
28 ROUND MESHES @ 6cm = 162cm
in 27 spaces
6, 1B1M @ 10cm = 60cm
9, 2B1M @ 16cm = 144cm
36 WING BARS @ 105% = 454cm
22.5 JIB BARS + ½ @ 105% = 290cm
TOTAL WEBBING = 2058cm
EXTENSION = 183cm [174cm E.T.E (1/2" s.s. wire) + 9cm (3/4" Bow shackle)]

TOTAL HEADROPE = 2424cm

**WIND ENDS**

**LOWER**
BOTTOM - 14.5 JIB BARS + ½ @ 1.025 = 184.5cm
SIDE- 22.5 JIB BARS + ½ @ 1.0 = 276cm
TOTAL = 460.5cm

**UPPER**
TOP - 22.5 JIBBARS + ½ @ 1.0 = 276
SIDE - 22.5 JIBBARS + ½ @ 1.0 = 276
TOTAL = 552cm
HEADROPE HANGING RATIOS

2058 cm eye to eye
12.0 cm (kc-kc) meshes along headrope
Bars hung at 105%
Wing End Up & Down Lines
Hanging Ratios
12.0cm (kc-kc) double 4mm, Eurolinx

Upper = 552cm eye to eye
Lower = 460.5cm eye to eye

22.5 Jib Bars+\(\frac{1}{2}\)
hung @ 1.0
upper and side
552cm eye to eye

22.5 Jib Bars+\(\frac{1}{2}\)
hung @ 1.0 on side
14.5 Jib Bars+\(\frac{1}{2}\)
hung @ 1.025 on bottom
460.5cm eye to eye
400x12cm. selvedge plan

12cm. double 4mm.

8(2B1M)
6(1B1M)

11.5°

24 MESHES

BOTTOM
400x12cm. Selvedge plan

TOP

12cm. double 4mm.

8(2B1M)
6(1B1M)

11.5

28 Mesbes
**NOTES**

Total Headrope Length = 2424cm ETE including port and starboard 3/4" bow shackles and 174cm, 1/2" stainless steel wire, extensions.

Upper wing end length is 685cm ETE including the middle 3/4" bow shackle and 124cm, 5/8" stainless steel wire, extension.

Lower wing end length is 592cm ETE including the lower 3/4" bow shackle and 124cm, 5/8" stainless steel wire, extension.

3 Nokalon #508, 8" center hole, orange trawl floats are put onto each top, 174cm extension. The floats are separated by 4" x 1/2" rubber cookies.
FLOAT ARRANGEMENT

NOTES:
All floats are Nokalon #508
8” center hole, orange trawl floats
Bolschline Center Section
Spacing

842cm Length, outside eye/outside eye

76 Snowmen
14 Hangers,
6 Clamps total

Cut wire 827.5 cm
String cookies from center
Then swage sockets
Bolschline Wing Spacing

782.6 cm Length, outside eye/outside eye
Cut wire 766.2 cm

61 Snowmen  13 Hangers  2 Clamps
100x75 Mesh Codend

2 panels of 12cm (knot center), 4mm double Euroline Webbing. 52 x 75 meshes each, gored together with 1" gore ropes. 4 meshes in each gore (2 mesh from each panel).

Center Mesh forward, aft, top and bottom marked with orange poly twine.
NEFSC 4 Seam, 3 Bridle Survey Trawl
Rigging Profile

174 cm

60 ft.

124 cm

60 ft.

124 cm

60 ft. includes swivel

75 cm - 97 cm

120 ft.

9/16" galv. fibercore wire rope 6x19

3/4" galv. fibercore wire rope 6x19
Top Wing End Extension Detail

3/4" Bow Shackle
1 3/4" conveyor cut cookies, cover wire to keep floats near end of extension.
4" cookies
3-Nokalon 8" center hole orange trawl floats

174cm Eye to Eye
1/2" s.s. Wire

9/16" galv. wire
1/2" Hammerlock
Middle Wing End
Extension Detail

3/4" Bow Shackle

124cm Eye to Eye
5/8" s.s. wire

5/8" Hammerlock

9/16" galv. wire
Lower Wing End
Extension Detail

- 3/4" Bow Shackle
- 124cm Eye to Eye
- 5/8" s.s. Wire
- Blueline Butterfly Plate #E26 and 14" Bunt Bobbin
- 9/16" galv. wire traveler
- 8 links 5/8" Trawlax (+5 hanging for adjustments)
- 5/8" Hammerlocks
- 3/4" Swivel
- 3/4" Shackles
- 3/4" galv. wire
- 4 links 5/8" Trawlax
- 5/6" Hammerlock

Dimensions:
- 97cm
- Lower Wing End
- Bowseline
- Sweep
- 5/8" Hammerlock
Upper Legs Connection Detail

9/16" galv. fibercore wire rope 6x19

5/8" Swivel

9/16" galv. fibercore wire rope 6x19