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TRAWLING OFF THE SOUTHEASTERN U.S. COAST



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Issued by the Georgia Sea Grant College Program
The University of Georgia, Athens, Georgia
Marine Extension Bulletin No. 8

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Published 1985

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This publication is a result of work sponsored by the Gulf and South Atlantic Fisheries Development Foundation, The University of Georgia, and the National Oceanic and Atmospheric Administration, U.S. Department of Commerce, through the National Sea Grant College Program (Grant # NA80 AA-D-0091 and NA84 AA-D-0072).

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INTRODUCTION

The major seafood industry in the South Atlantic Bight is based on shrimp, and this dependence on one crop has made the industry financially precarious. In recent years, weather-caused mortality of shrimp populations, escalating fuel costs, and the increased numbers of vessels have squeezed profit margins to the limit. Therefore, fishermen have looked to other activities such as bottom trawling for finfishes to supplement their income. This is not the single salvation for the whole industry. Although fish trawling can offer an alternative which may aid some shrimpers in maintaining year-round income, suitable trawling bottom in this area is limited, and target species of such a fishery (snapper, grouper, and porgies) are relatively long-lived, slow-growing, and can sustain only limited fishing pressure. This bulletin contains information on how to modify a vessel for bottom trawling, fishing tips, and recommended areas to fish.

MODIFICATIONS

To convert a typical shrimp boat to fish trawling, the following boat and gear modifications are necessary.

ADDITION OF GALLOWS

Stern trawling with gallows is essential to tow a single roller-rigged fish trawl. These trawls cannot be towed efficiently from all outriggers because of the long 30' to 120' leglines/net bridles. The most common type of gallows is the H-shaped gallows with four support legs and a cross support or strongback (Figure 1).

These are simple to construct and relatively easy to install, but must be firmly fastened to the deck and have the ability to withstand the strains and pressures of trawling over rough bottom. Estimated construction costs including tow blocks are \$3,000 to \$4,000 for materials only.

Another type of gallows common on steel hull vessels is the free-standing gallows rig. This has no cross support or strongback between the two towing supports and is known as a tripod cantilever type. This rig (Figure 2) can be installed on wooden or fiberglass boats, but reduces working space on deck more than the H-shaped gallows because six support legs must be attached to the deck instead of four.

When stern trawling is to be carried out on a steel, wooden, or fiberglass vessel, the caprails, bulwarks, and hull should be sheathed with some protective material. This prevents the heavy trawl doors from banging and chafing the sides of the boat. Gallows should be located forward of the rudder to provide maximum maneuverability and should have sufficient height to allow the tow cables to clear the stern when making a hard turn.

CUT-OUT STERN

A cut-out stern is a must when operating a stern trawler with a net reel. The opening in the stern should be two feet wider than the distance between the flanges of the reel to keep the net from getting hung on the side of the chute. When a net reel is not used, a cut-away stern is still useful for setting and retrieving the trawl. If there is no cut-away stern, the cod end must be retrieved over the side of the vessel.

NET REEL

A net reel (Figure 3), although not a necessity, makes the job of gear deployment and retrieval simpler, safer, and faster than alternative methods. Another advantage is that

it allows the crew to inspect the net as it is being retrieved. The ideal location for a net reel is as close to the stern bulwarks as possible. The catch is dumped on deck by whipping the bag underneath the reel. The net is then re-set while the catch lies on the deck. Net reels also provide safe storage for the trawl, especially when making passage in rough weather.

Most net reels installed on trawling vessels are operated by hydraulics. One alternative is a yo-yo net reel (Figure 4). In this case, the trynet winch is used to turn the net reel's drum. A cable is run from the trynet winch to the net reel. The trawl net is retrieved as the trynet winch takes up the cable which is wrapped around the net reel drum. The net and bridles are set by slacking off the drum on the trynet winch.

GROUND SWEEP GEAR

Even though a wide variety of nets are used in fish trawling, experienced captains agree that a protective sweep is necessary to keep trawl damage at a minimum. The recommended sweep is a 6" cookie sweep (Figure 5) with 12"-diameter molded rubber rollers in the belly section and bunt rollers in the wing section. A roller-rigged sweep (Figure 6) constructed of 10" to 12" rubber rollers spaced with 4" rubber cookies is threaded on 3/8" Trawlex steel chain. Rubber rollers roll over the bottom and help keep the net from hanging on bottom obstructions.

Rock-hopper sweeps (Figure 7), developed in England, currently are being evaluated in the United States. These differ from standard roller gear in that 10", 12", and 14" rubber discs, cut from auto tires, are held stationary by a chain. Unlike typical roller gear, which is fabricated from molded rubber and which rolls over bottom obstructions, rock-hoppers are fixed directly to the trawl and bounce over bottom obstructions.

NETS

Many different bottom trawl designs exist, but these are currently available: the Mongoose trawl (Figure 8), the four-seam fish trawl (Figure 9), the Billy Burbank fish trawl (Figure 10), and the modified Yankee 36 fish trawl (Figure 11).

DOORS

Steel V-doors (Figure 12) are recommended for deep-water fish trawling because they fall away from each other when setting out. This reduces the chance of them crossing over each other—a common problem with flat rectangular wooden trawl doors when they are not set properly. Another advantage of steel doors is their durability. They are less susceptible to damage from bottom obstructions. The hinged towing bracket of steel V-doors reduces the chances of the board becoming fast on the bottom. Unlike the chain or fixed bracket door, the bottom of a steel V-door will swing out when it hits an obstruction.

Steel V-doors have one disadvantage: their net spreading ability is 15 to 20 percent less than the same size flat wooden door.

TOW CABLE AND WINCH

A main tow cable size of 9/16"-diameter or larger is recommended for fish trawling.

A winch with hand screw brakes that tighten to stop the cable, instead of a dogged-off pawl, is recommended. If a hang were to occur, a dogged-off pawl would not allow cable slippage. Either the tow cable would break or severe net damage would occur. If a hang occurs using a winch with hand screw brakes, net damage is

reduced because the winch allows the cable to slip, similar to setting the drag on a fishing reel. This allows the captain time to stop the boat and, hopefully, reduce net damage.

WIRE SCOPE

Wire scope is the ratio of tow wire length to water depth. For steel V-doors, the scope should be 3:1, 4:1, or 5:1. The best ratio depends on the weight of the doors and the trawling gear for maximum fishing efficiency. Generally, a scope of 5:1 is recommended for trawling with steel doors; therefore, 125 fathoms of tow wire would be required in a water depth of 25 fathoms. On an extremely rough bottom, the scope of the wire may be reduced to a 3:1 ratio; this reduces the chance of hanging up.

SETTING AND RETRIEVING THE GEAR WITHOUT A NET REEL

Gear retrieval with a net reel is relatively easy. The entire assemblage (bridles, roller gear, and net) can be wound on the reel after the trawl has been detached from the doors. Without a net reel, trawl retrieval is more complicated.

The hauling and setting procedures of a roller-rigged fish trawl and its associated gear over the stern is more difficult for boats not equipped with a net reel.

Upon arrival on the grounds, the trawl is laid across the stern caprail of the vessel with the cod end on top of the pile (Figure 1).

Following a signal from the captain as the boat steams slowly ahead, the cod end is dropped over the stern. The drag of the netting through the water provides the power to pull the trawl, rollers, and floats overboard with a minimum of physical exertion by the crew.

Once the gear is clear of the boat and ready for setting, the procedure for attaching the trawl to the trawl doors commences.

With the wings of the trawl at the gallows, the brake on the main winch is slowly released. The entire length of the net's bridles passes through the Kelly's eye (Figure 13), until it jams against the stopper. The stopper is attached to the back straps of the trawl doors.

The strain of the fishing gear is now on the doors which are hanging from the gallows on a dog chain. This is a chain/hook arrangement with the hook hanging on the free end. The hook is passed through a pad-eye on the trawl door and it hangs from the gallows prior to setting out.

A short length of wire (the idler wire) is attached between the stopper and the coupling link on the main towing wire. The purpose of this wire is to allow the coupling link to be clipped to a G-hook shackled to the steel bracket of the trawl door.

The door is then lifted a few inches to release the dog chain hook. The main towing cable now supports the weight of the entire trawling gear hanging in the gallows' block.

The captain is now ready to set out. The boat is set in a straight course, and the speed of the vessel is increased. The winch brakes are released slowly and the tow cable on each side must be released smoothly and evenly to keep the doors from coming together. When the last 10 to 12 fathoms approach, the vessel's speed is reduced so that the cable marks on each wire can be aligned and the brakes tightened. Then the vessel is brought up to towing speed.

During haul-back (Figure 14), the doors are brought up the gallows, chained off with the dog chain, and suspended from the gallows. The main tow cable is then slackened off enough to release the G-hook on the door from the coupling link on the tow cable. The trawl cable is now free from the boards. The winchman proceeds to wind the idler wire on the main drum of the winch. Attached to this idler wire are the scissor bridles. As the scissor bridles are being wound up on the winch drum, they pass through the Kelly's eye.

When the net's wings reach the gallows towing block, a pennant from the port side is attached to the starboard wing; then the starboard wing is slackened off, allowing the net to lay over to the port side, providing an unobstructed alley for cod end retrieval. The lazyline, which is attached to the wing of the net with a G-hook, is unclipped and hooked to another G-hook on the trynet cable. The trynet cable is fair-led to a block on the outrigger, then to a block on the boom centered over the dumping areas on the deck. The bag is brought on board over the stern rail (by taking up on the trynet winch and winding up the lazyline on the winch drum). The fish are dumped, the bag is retied and thrown overboard, and the trynet winch is slackened off. The lazyline is unclipped from the trynet winch cable and reattached to the wing of the net. The net is again ready to be set.

LESS SUCCESSFUL TRAWL METHODS

Some attempts using crab nets, readily available and rigged with light chain and plastic mud rollers, proved to be inadequate for offshore fish trawling on broken bottom. Light molded plastic mud rollers were not durable and did not prevent net damage. Captains who had tried crab nets soon abandoned them and preferred nets made with heavy netting (No. 30 thread and up), properly rigged sweep systems, and steel V-doors for fish trawling over rough bottom areas.

One captain tried towing two modified crab nets simultaneously, one on each side of the vessel. Several problems arose. The offshore currents pulled the nets together and tangled them. Also, difficulties arose while trying to change course and avoid bottom obstructions. Considerable net damage occurred, and the idea was abandoned after two trips. Another captain stated, "Just gearing up with crab nets and running offshore to catch fish will not work."

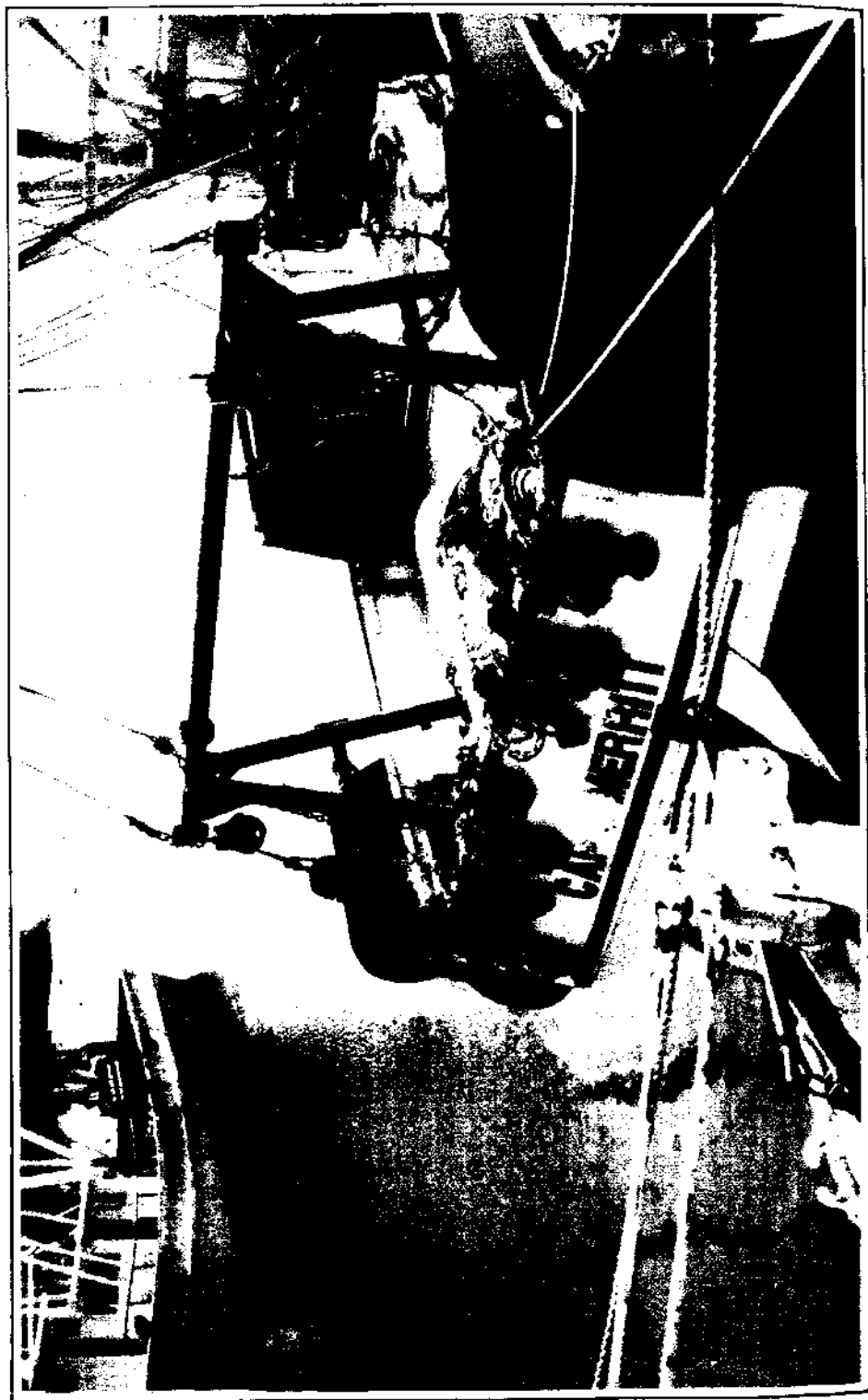


FIGURE 1. Typical H-shaped gallows with a strongback support and trawl lying across the stern caprail

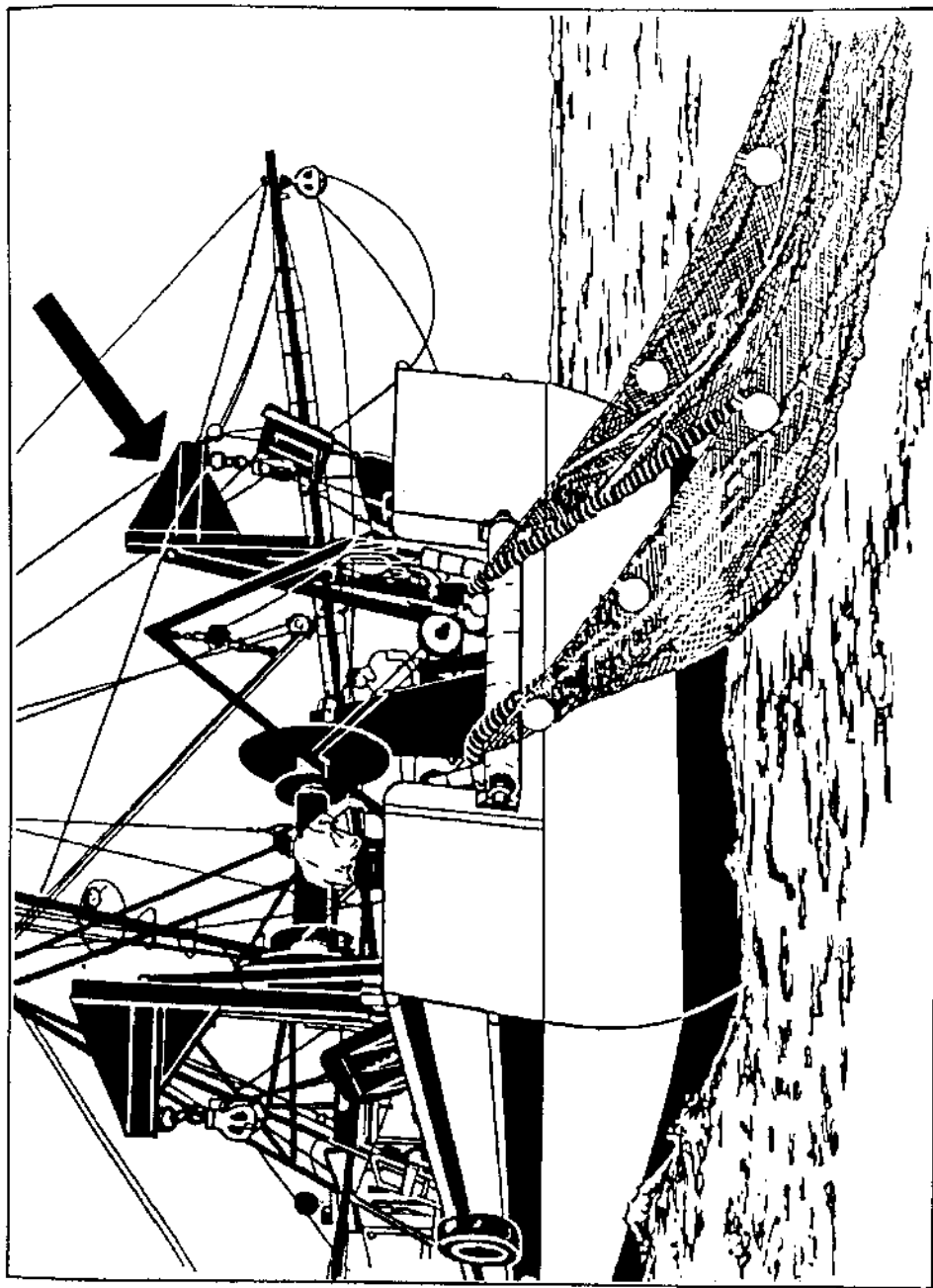


FIGURE 2. Tripod cantilever type gallows

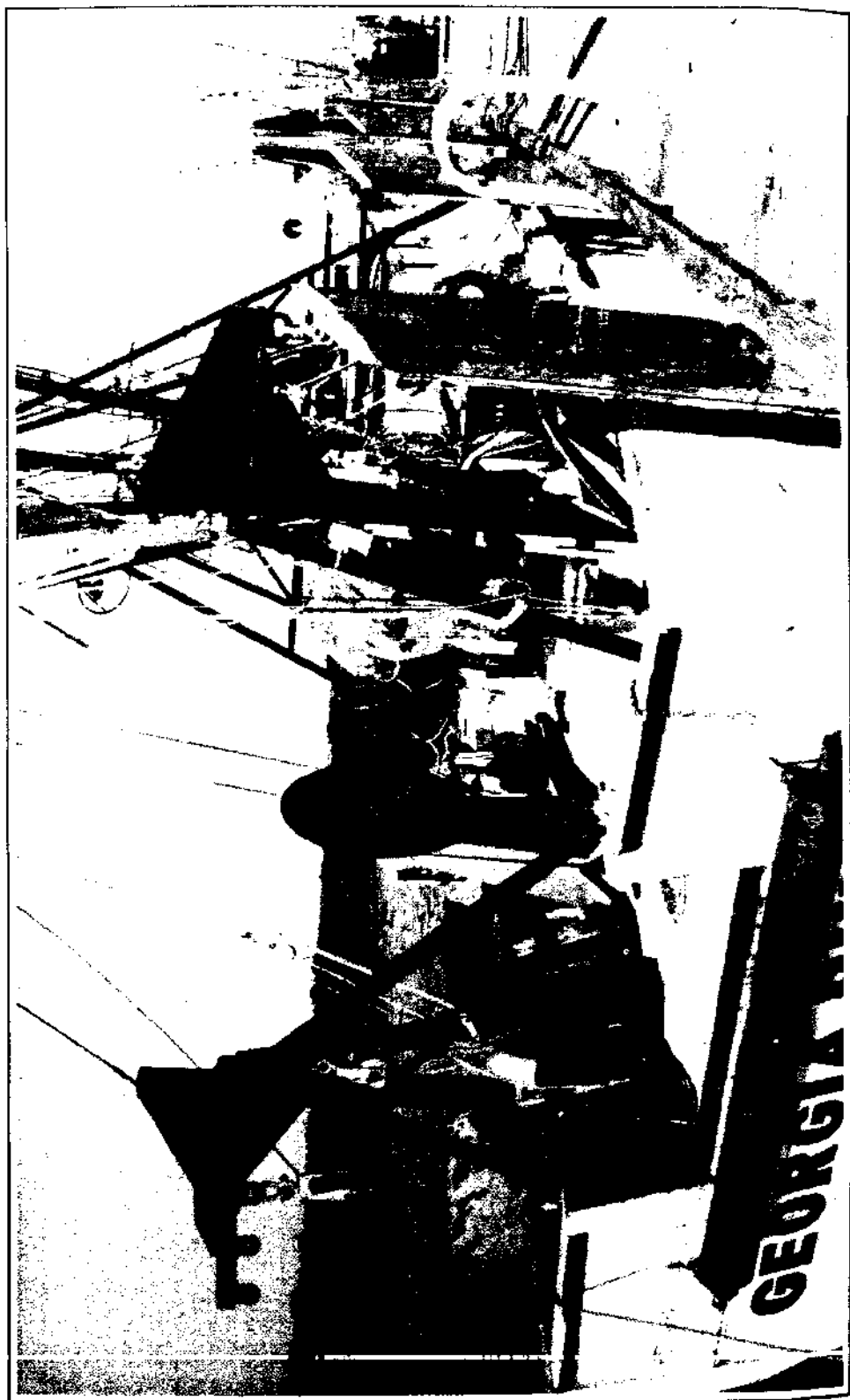


FIGURE 3. Net reel used on a stern trawling vessel

YO-YO RIGGED NET REEL OPERATIONS

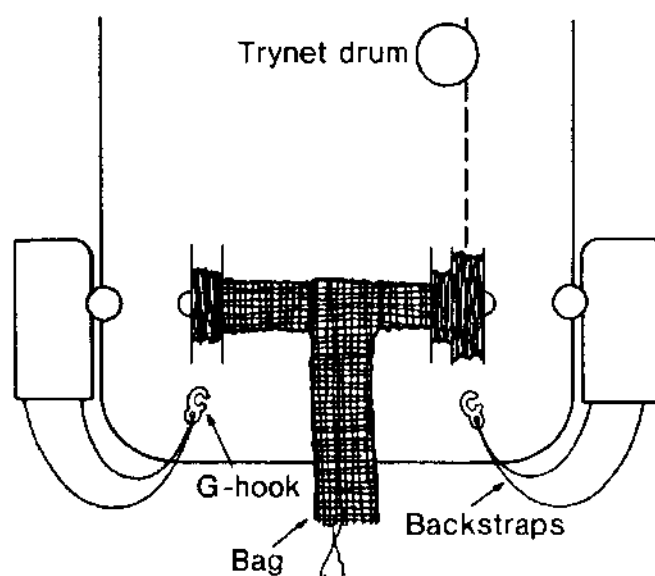


FIGURE 4A. Upon arrival on the fishing grounds, the bag is lowered over the stern as the boat steams ahead. As the trawl, bridles (scissors), and ground cables are slackened, the trynet cable is pulled from the trynet drum and spooled on the net reel.

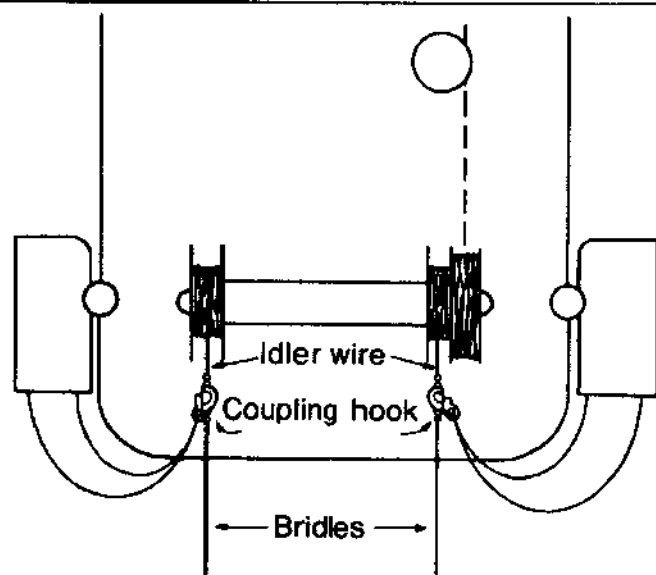


FIGURE 4B. The trynet brakes are applied when each coupling hook (attached to the ground cable) reaches a point inside the stern bulwarks. The G-hooks (attached to trawl board back straps) are engaged in the coupling hooks. The strain of the fishing gear is now on the net reel.

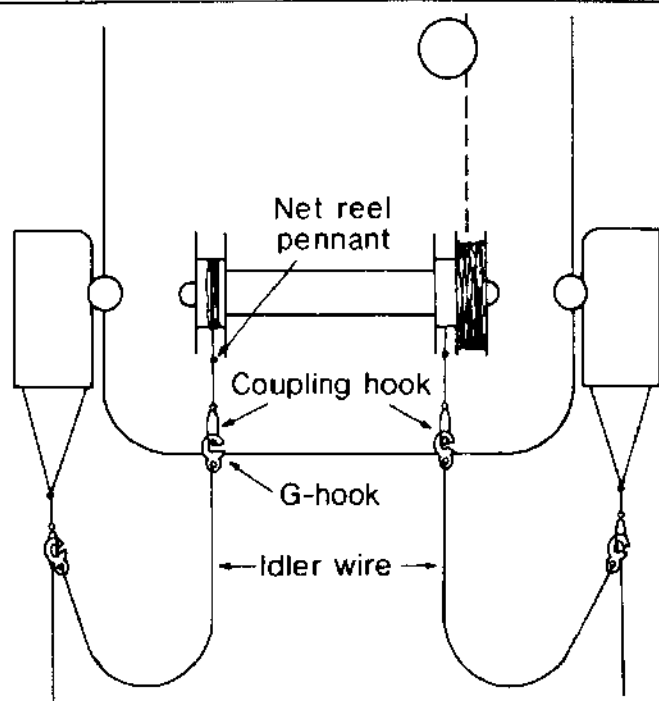


FIGURE 4C. The trynet cable is slackened until all of the strain of the fishing gear is on the trawl board back straps.

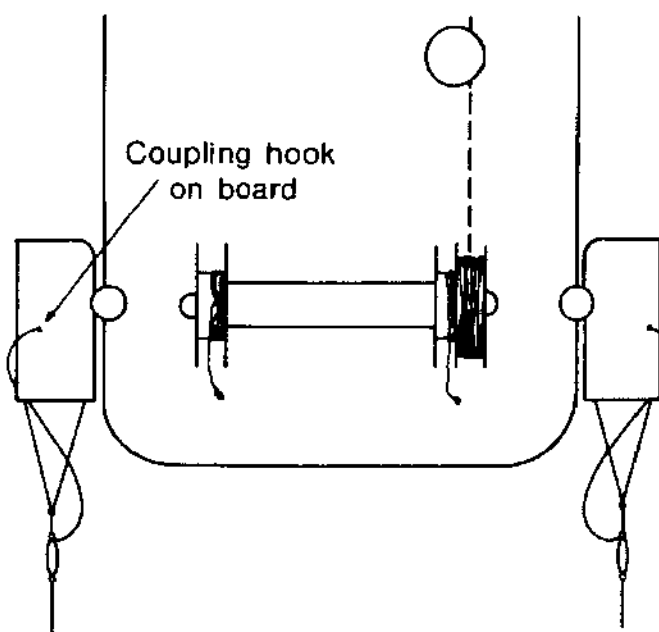


FIGURE 4D. The idler wires are unhooked from the net reel and attached to the trawl boards. The trawl and its associated gear is now free of the net reel and ready for setting out. To haul back, the process is reversed and the net reel powered by hauling on the trynet drum.

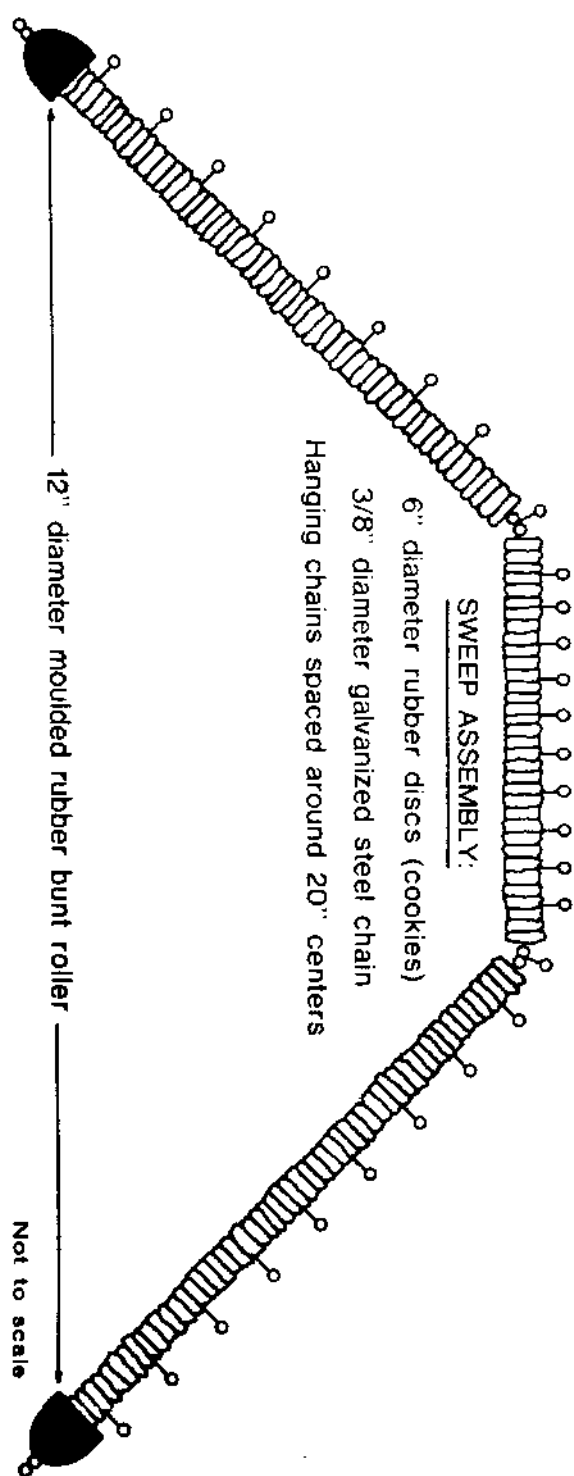


FIGURE 5. Cookie sweep construction

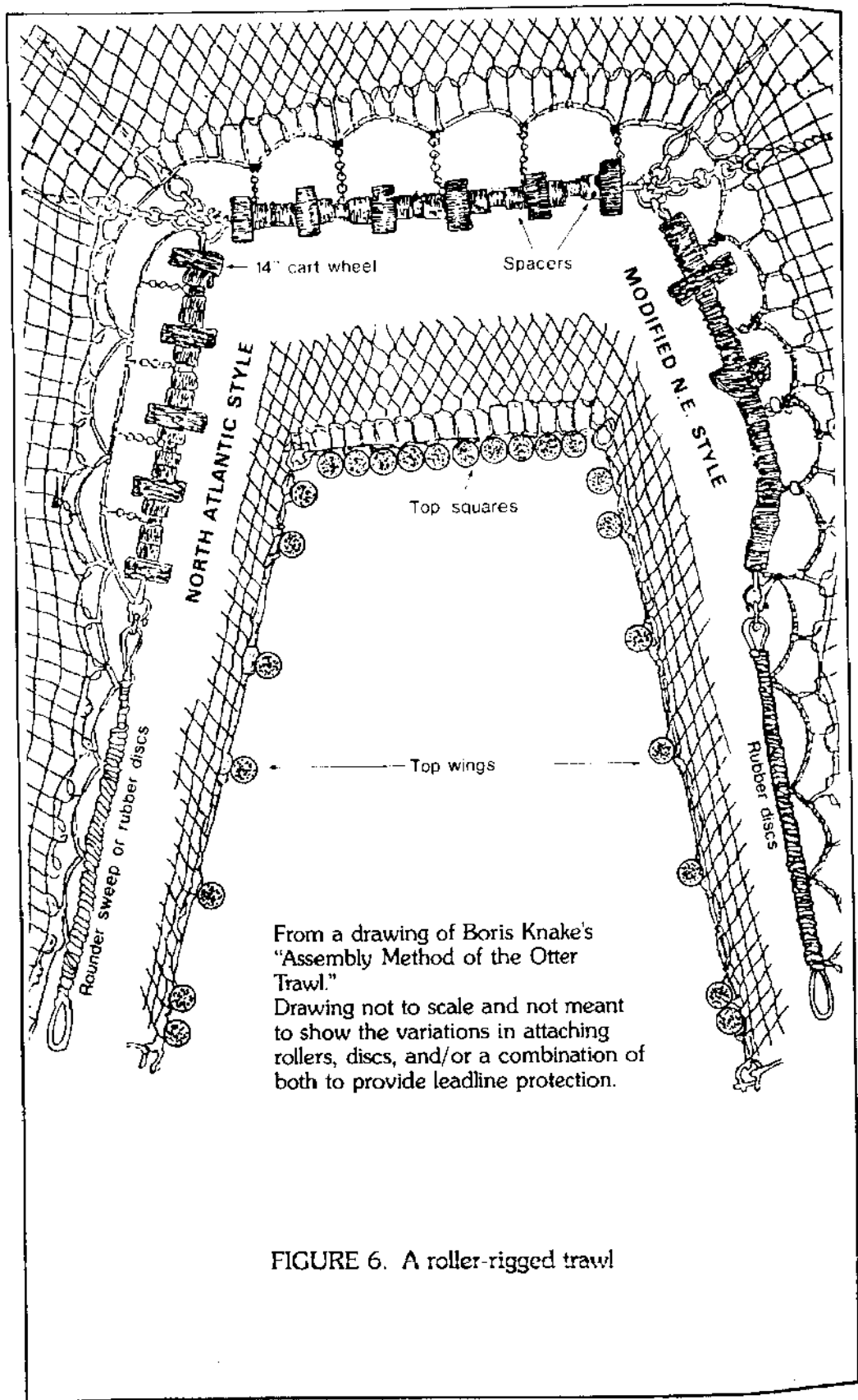


FIGURE 6. A roller-rigged trawl

ROCK HOPPER TRAWLING GEAR

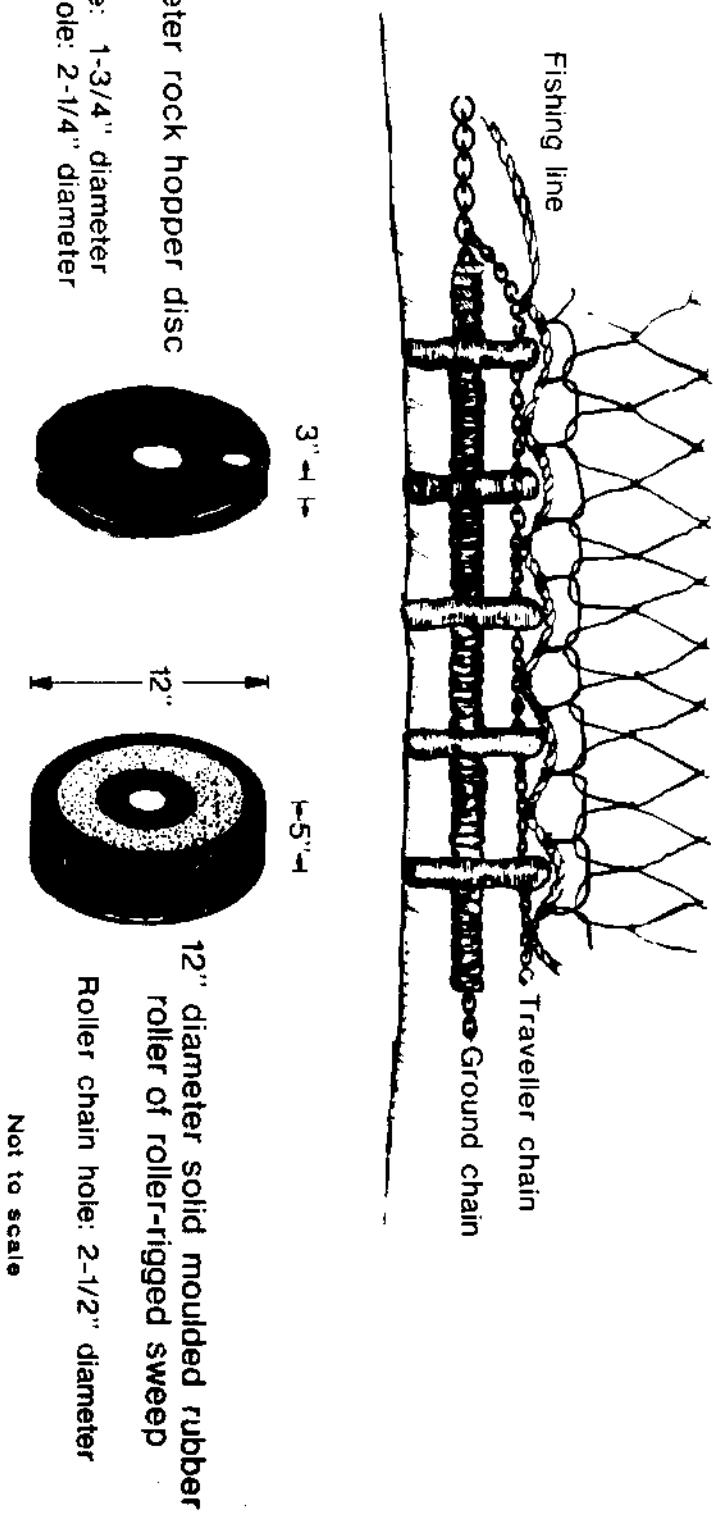


FIGURE 7. Diagram comparing a rock-hopper sweep to a roller-rigged sweep

MONGOOSE FISH TRAWL

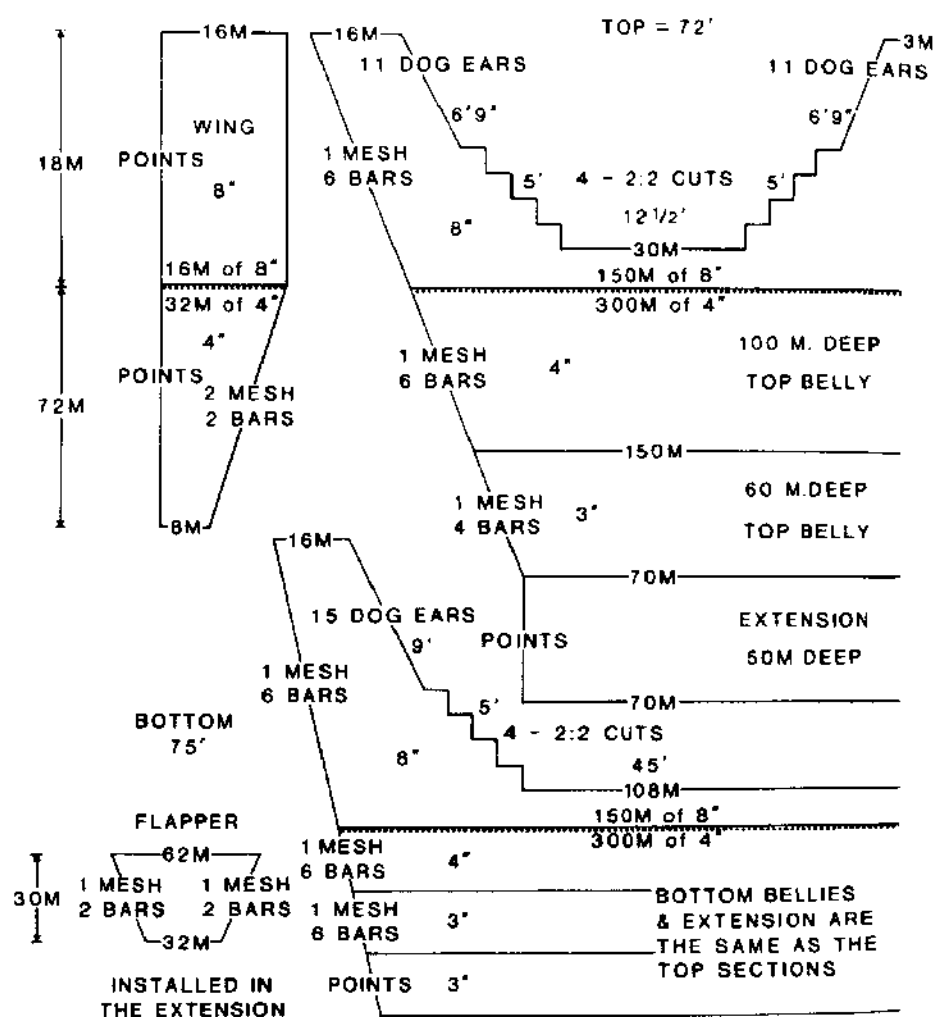


FIGURE 8. Schematic of a Mongoose fish trawl

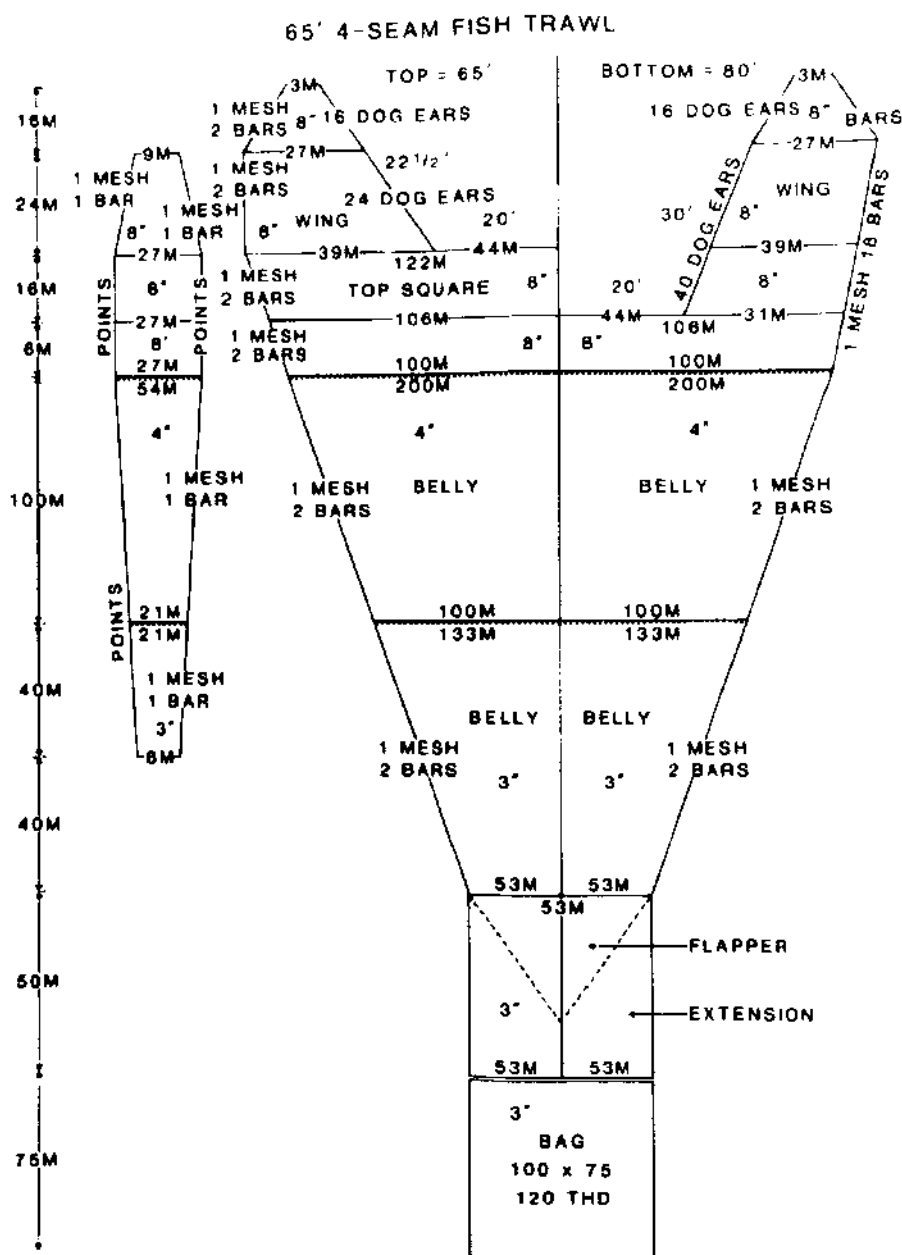


FIGURE 9. Schematic of a four-seam high-opening fish trawl

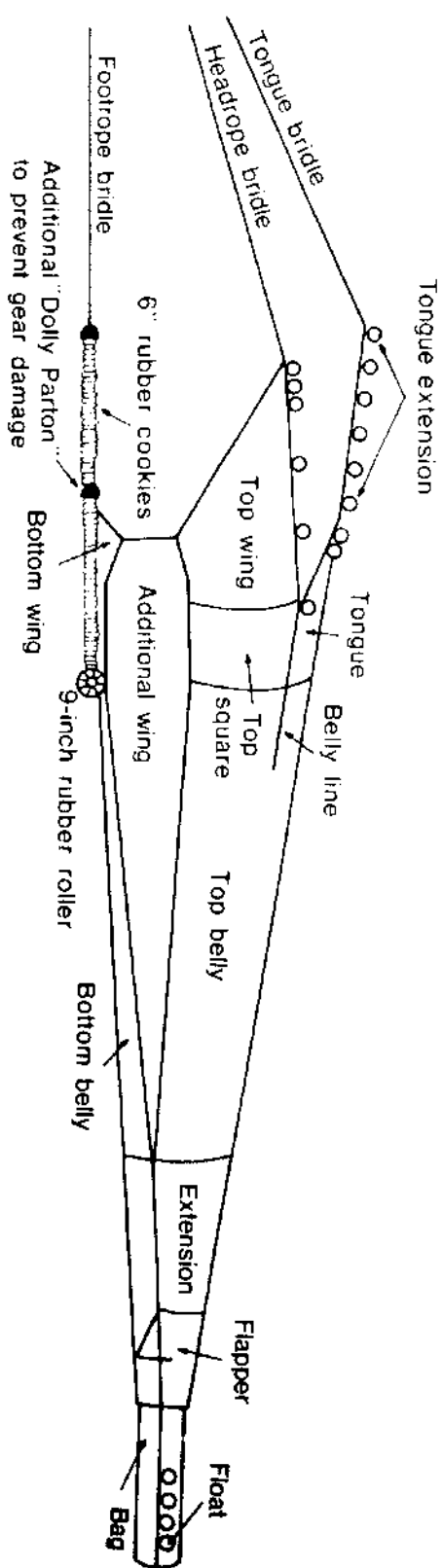


FIGURE 11. Side view of modified Yankee 36 roller-rigged fish trawl with additional wing



FIGURE 12. A steel V-door

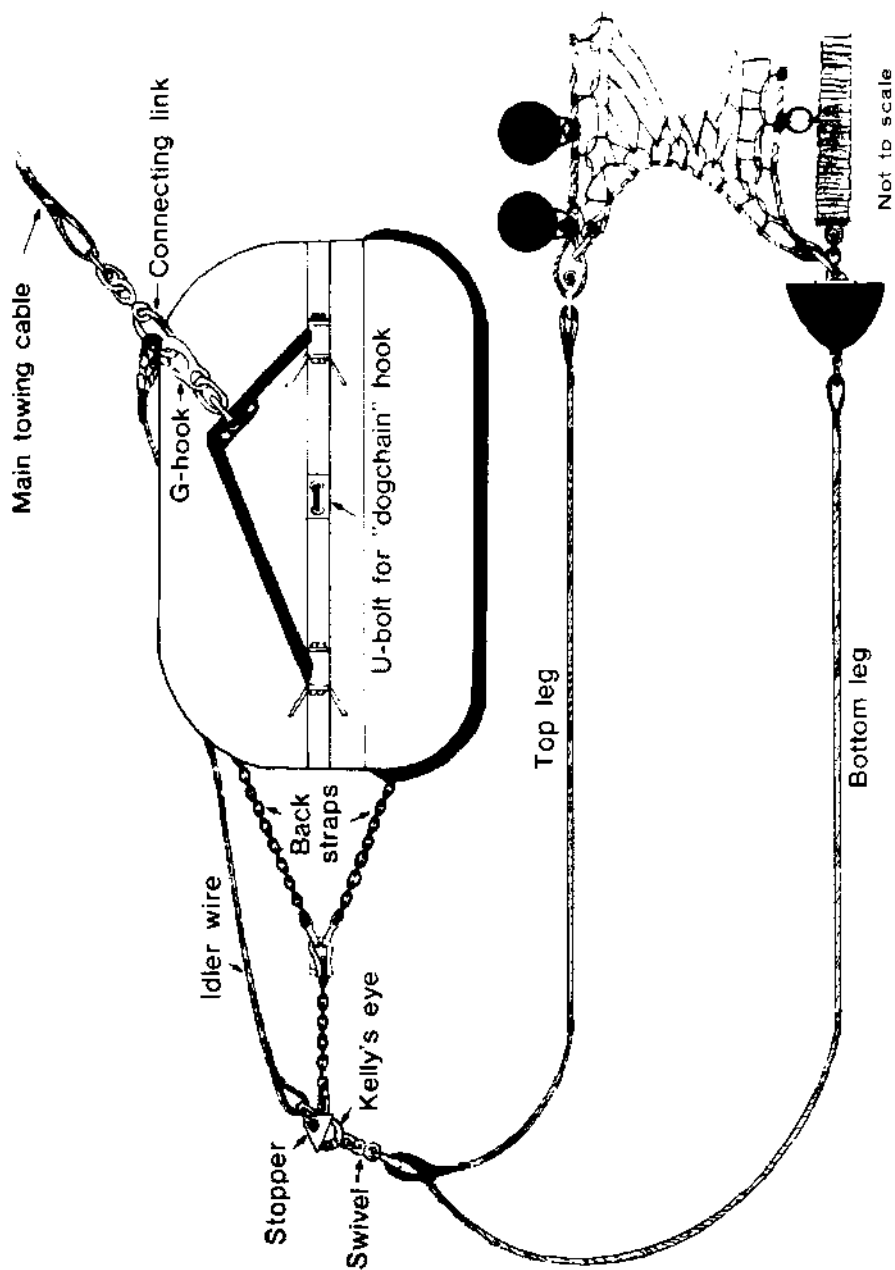


FIGURE 13. Schematic of door-to-net arrangement for fish trawling

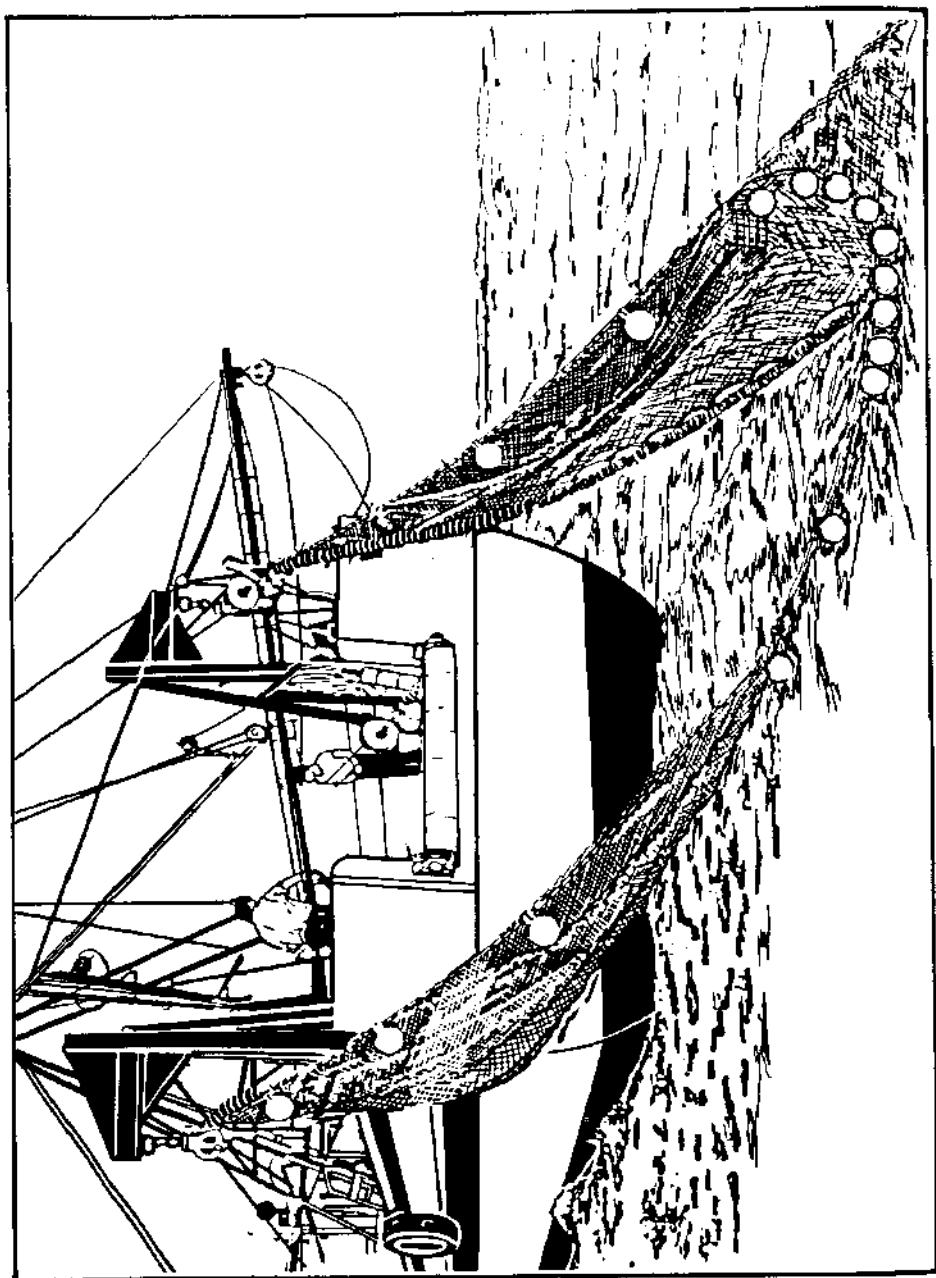


FIGURE 14A. Haul-back procedures without a net reel (The net is brought up to the gallows.)

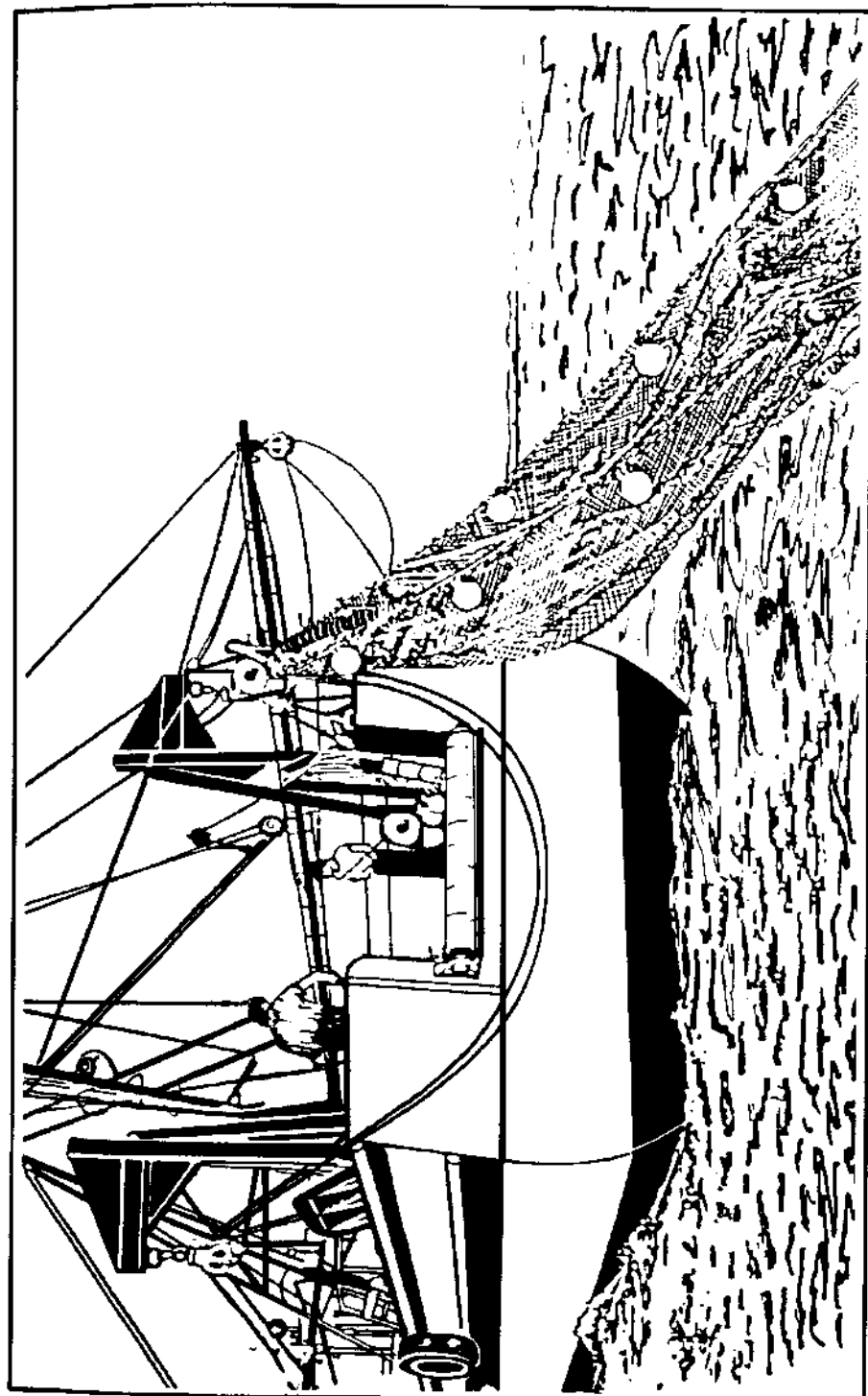


FIGURE 14B. Haul-back procedures without a net reel (One wing is slacked off and the lazyline is hooked up.)

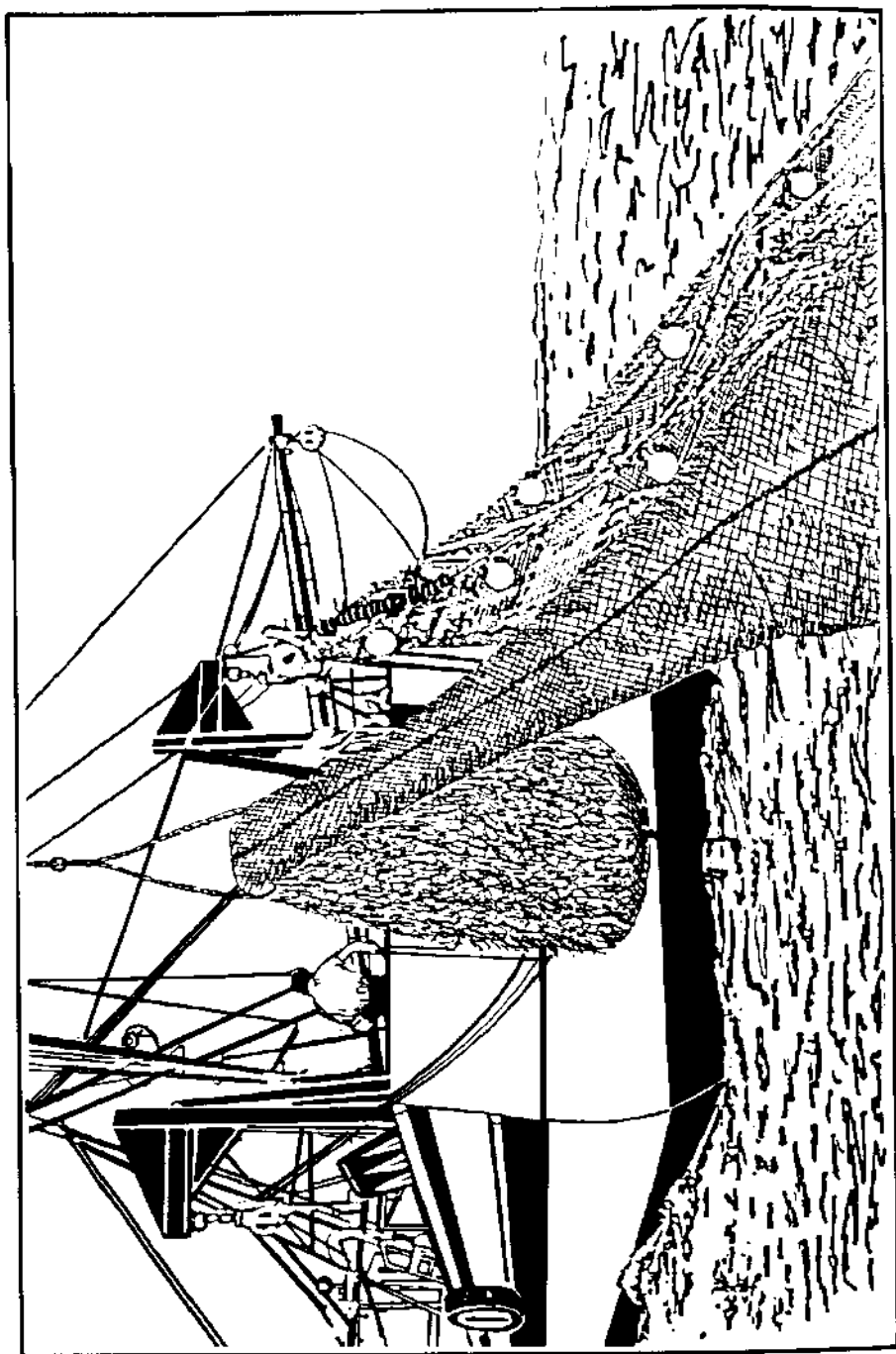


FIGURE 14C. Haul-back procedures without a net reel (Bag is retrieved over the stern by attaching the lazyline directly to the trynet winch and taking up.)

APPENDIX

The following LORAN-C readings (7980 chain) were compiled from commercial fishermen's logs as well as from research done by the *R/V Georgia Bulldog*. The readings are arranged by ascending Y-line (4-line), followed by the corresponding Z-line (6-line). After each pair of readings are notes regarding fish species caught or a description of the bottom. These readings are intended only as suggested spots to try fishing, and the ultimate success and responsibility of fishing using these readings rests with the vessel captain. Neither the people who collected these readings nor the personnel at this office can assume any responsibility for the accuracy of these readings or for conditions that might arise while fishing.

A key to the notes that follow each pair of readings is given below:

SNAPPER	red snapper (<i>Lutjanus campechanus</i>)
SNOWIES	snowy grouper (<i>Epinephelus niveatus</i>)
GOLDENS	golden tilefish (<i>Lopholatilus chamaeleonticeps</i>)
BLACK SEABASS	black seabass (<i>Centropristes striata</i>)
GROUPE	scamp (<i>Mycteroperea phenax</i>) and gag (<i>M. microlepis</i>)
B-LINERS	vermillion snapper (<i>Rhomboplites aurorubens</i>)
PORGIES	pink (<i>Pagrus pagrus</i>) and white porgies (<i>Calamus spp.</i>)
GREYTILE	grey tilefish (<i>Caulolatilys microps</i>)
HARD BOTTOM	an area of hard bottom usually with rock, limestone, or other hard substrates
HANG	an area where someone has hung up his net while trawling

Y	Z	Notes	Y	Z	Notes		
1.	44479.7	61697.4	snapper, grouper	8.	44637.2	61742.0	snapper, grouper, B-liners, porgies
2.	44545.4	61806.2	hard bottom (a large rock pile)	9.	44689.0	61690.2	snapper, grouper, B-liners, porgies
3.	44547.7	61810.8	hard bottom (a large rock pile)	10.	44715.0	61581.0	snowies
4.	44634.4	61750.5	hang off St. Augustine, FL	11.	44725.0	61587.5	snowies
5.	44635.0	61754.0	snapper, grouper, porgies	12.	44741.0	61558.3	wreck, hang
6.	44636.1	61734.3	snapper, grouper, B-liners, porgies	13.	44764.3	61568.6	snapper, grouper
7.	44636.6	61742.5	hang off St. Augustine, FL	14.	44818.1	61508.5	grouper
				15.	44887.0	61520.0	grouper
				16.	44914.0	61469.3	snapper, grouper
				17.	44915.6	61356.8	grouper
				18.	44918.0	61464.0	snapper, grouper

Y	Z	Notes
19.	44919.4	61456.5 snapper
20.	44919.6	61343.5 snapper, grouper
21.	44928.6	61356.8 snapper, grouper
22.	44930.9	61326.7 snowies
23.	44932.6	61325.7 snowies
24.	44933.2	61326.8 snowies
25.	44935.6	61450.6 good fish marks
26.	44940.4	61328.8 snowies
27.	44941.9	61411.6 large ledge (trough bottom)
28.	44946.8	61325.4 hand (a large, long ledge)
29.	44952.1	61458.1 grouper
30.	44952.6	61324.5 snapper (another spot is due north, 1 nautical mile from here)
31.	44954.6	61411.9 grouper (a fairly large ledge here)
32.	44971.6	61276.9 grouper
33.	44992.0	61130.0 hang
34.	45011.1	61329.8 marked good fish on this spot
35.	45018.9	61336.0 hard bottom (a live bottom area)
36.	45019.3	61308.9 snapper, grouper, porgies
37.	45019.6	61308.5 hang (hard bottom off Cumberland Island, GA)
38.	45019.6	61308.6 hang
39.	45022.1	61330.2 hang
40.	45046.8	61115.5 hang, hard bottom
41.	45056.0	61096.0 hang (caught spiny lobsters here)
42.	45076.5	61063.9 black seabass
43.	45080.6	60748.7 goldens
44.	45080.8	61052.6 black seabass
45.	45081.1	60761.5 goldens
46.	45081.1	60764.0 goldens
47.	45081.5	60846.5 goldens
48.	45081.5	60765.0 goldens
49.	45081.9	60748.1 goldens
50.	45082.0	60750.4 goldens
51.	45082.5	60740.2 goldens

Y	Z	Notes
52.	45083.5	60845.0 goldens
53.	45084.5	60731.1 goldens
54.	45085.7	60805.5 goldens
55.	45086.1	60765.3 goldens
56.	45087.1	60770.4 snowies
57.	45087.1	60747.6 goldens
58.	45087.4	60765.3 goldens
59.	45087.6	60770.6 snowies
60.	45087.7	60771.1 snowies
61.	45087.8	60713.0 goldens
62.	45087.8	60769.7 snowies
63.	45088.0	60747.0 goldens
64.	45088.0	60760.0 goldens
65.	45088.1	60773.4 goldens, snowies
66.	45088.3	60772.3 snowies, goldens
67.	45088.3	60772.0 snowies, goldens
68.	45088.6	60731.0 goldens
69.	45088.7	60771.3 snowies
70.	45088.8	60772.6 goldens, snowies
71.	45088.9	60772.4 snowies, goldens
72.	45088.9	60749.0 goldens
73.	45088.9	60784.9 goldens
74.	45088.9	60820.2 goldens, greytile
75.	45089.0	60768.6 goldens
76.	45089.0	60775.0 goldens, snowies
77.	45089.1	60772.0 goldens
78.	45089.3	60763.0 snowies, goldens
79.	45089.3	60756.2 goldens
80.	45089.6	60699.8 goldens
81.	45089.6	60759.3 goldens
82.	45089.7	60718.5 goldens
83.	45089.8	60761.1 snowies
84.	45089.8	60811.7 goldens, greytile
85.	45090.0	60760.9 snowies
86.	45090.0	60812.6 goldens, greytile
87.	45090.1	60718.4 goldens
88.	45090.1	60756.8 goldens
89.	45090.5	60742.0 goldens
90.	45090.6	60732.6 goldens
91.	45091.0	60743.0 goldens
92.	45091.0	60759.0 goldens
93.	45091.0	60753.0 goldens
94.	45091.0	60755.0 goldens
95.	45091.9	60732.4 goldens
96.	45093.0	60742.0 goldens
97.	45093.1	60718.0 goldens
98.	45093.1	60767.3 goldens

Y	Z	Notes
99.	45093.2	60729.0 goldens
100.	45093.3	60725.0 goldens
101.	45093.6	60735.0 goldens
102.	45094.0	60694.5 goldens
103.	45094.0	60733.9 goldens (98 fathoms deep)
104.	45094.0	60740.0 goldens
105.	45094.0	60730.0 goldens
106.	45094.2	60718.0 goldens
107.	45094.2	60739.6 goldens
108.	45094.4	60760.0 goldens
109.	45095.0	60740.0 goldens
110.	45095.7	60745.9 goldens
111.	45095.8	60723.7 goldens
112.	45095.8	60779.9 goldens, greytile
113.	45096.0	60771.2 goldens, greytile
114.	45096.0	60771.0 goldens, greytile
115.	45096.1	60724.2 goldens
116.	45096.2	60715.3 goldens
117.	45096.2	60764.0 goldens, greytile
118.	45096.4	60762.8 goldens, greytile
119.	45096.9	60749.6 goldens (92 fathoms deep)
120.	45096.9	60782.4 goldens, greytile
121.	45097.0	60764.0 goldens, greytile
122.	45097.6	60734.9 goldens
123.	45097.9	60536.3 goldens
124.	45098.0	60744.1 goldens, snowies, greytile
125.	45098.1	60555.3 goldens
126.	45098.1	60763.7 goldens
127.	45098.3	60554.2 goldens
128.	45098.5	60711.9 goldens
129.	45098.6	60754.1 goldens, greytile
130.	45098.7	60704.9 goldens
131.	45098.8	60762.7 goldens, greytile
132.	45098.8	60765.4 goldens, greytile
133.	45098.9	60749.2 goldens
134.	45099.0	60746.7 goldens
135.	45099.2	60745.8 goldens, greytile
136.	45099.2	60794.1 goldens, greytile
137.	45099.3	60746.5 goldens, greytile
138.	45099.4	60707.3 goldens
139.	45099.5	60554.6 goldens
140.	45099.8	60747.9 goldens, greytile
141.	45100.2	60711.5 goldens

Y	Z	Notes
142.	45100.2	60760.0 goldens, greytile
143.	45100.4	60748.0 goldens
144.	45100.6	60710.4 goldens
145.	45100.7	60757.2 goldens
146.	45101.2	60548.3 goldens
147.	45101.4	60696.8 goldens
148.	45101.5	60749.3 goldens
149.	45101.5	60733.0 snowies, goldens
150.	45101.5	60728.0 snowies, goldens
151.	45101.6	60554.2 goldens
152.	45101.6	60749.4 goldens
153.	45101.7	60550.6 goldens
154.	45101.8	60556.3 goldens
155.	45101.8	60746.8 goldens, greytile
156.	45102.5	60690.7 goldens
157.	45102.8	60550.5 goldens
158.	45102.8	60541.6 goldens
159.	45103.0	60553.1 goldens
160.	45103.1	60738.6 goldens
161.	45103.7	60827.9 greytile
162.	45104.4	60511.9 goldens (122 fathoms deep)
163.	45105.1	60722.5 snowies, goldens
164.	45107.0	60745.0 goldens, greytile
165.	45107.9	60842.1 snowies
166.	45108.0	60837.0 greytile
167.	45109.0	60828.0 snowies
168.	45109.0	60830.0 snowies
169.	45109.0	60817.1 snowies, greytile
170.	45109.0	60835.0 snowies
171.	45109.1	60832.0 snowies, greytile
172.	45109.2	60830.2 snowies
173.	45109.2	60829.0 snowies
174.	45109.2	60831.0 snowies, greytile
175.	45109.2	60823.1 goldens, snowies
176.	45109.4	60816.2 snowies
177.	45109.4	60914.0 snapper, porgies
178.	45109.4	60837.0 snowies, greytile
179.	45109.4	60828.4 hang
180.	45109.5	60903.0 snapper, grouper
181.	45109.6	60820.0 snowies, greytile
182.	45109.6	60837.4 snowies
183.	45109.7	60827.8 snowies, greytile
184.	45109.7	60825.9 goldens, snowies
185.	45109.7	60831.5 snowies
186.	45109.9	60816.2 goldens, snowies
187.	45110.1	60845.5 snowies

Y	Z	Notes	Y	Z	Notes
188.	45110.1	60815.0 snowies	223.	45116.9	60834.7 goldens
189.	45110.3	60823.7 snowies	224.	45116.9	60779.3 snowies, greytile
190.	45110.4	60820.1 hang (a good place to handline)	225.	45116.9	60923.7 snapper, grouper, porgies
191.	45110.5	60808.7 snowies	226.	45117.0	60906.0 congers
192.	45110.6	60492.3 goldens	227.	45117.2	60898.2 hang
193.	45110.8	60502.3 goldens	228.	45117.3	60906.6 snapper, grouper, porgies
194.	45110.9	60814.8 snowies	229.	45117.5	60904.5 grouper, porgies
195.	45111.3	60820.2 snowies	230.	45117.5	60919.5 snapper, grouper
196.	45111.5	60911.0 snapper, grouper, porgies	231.	45117.6	60898.8 snapper, grouper, porgies
197.	45111.8	60911.8 snapper, grouper, porgies	232.	45117.8	60890.7 snapper, grouper, porgies
198.	45112.3	60914.5 hang	233.	45117.9	60924.4 snapper, grouper, porgies
199.	45112.9	60918.0 snapper, grouper, porgies	234.	45118.0	60867.4 snowies (a large ledge)
200.	45113.0	60817.0 snowies	235.	45118.0	60918.0 snapper, grouper, porgies
201.	45113.3	60907.6 hang	236.	45118.0	60927.0 hang (a good one! great place to handline)
202.	45113.3	60818.1 snowies	237.	45118.2	60927.5 B-liners, porgies
203.	45113.5	60910.7 snapper, grouper, porgies	238.	45118.2	60925.5 hard bottom
204.	45113.6	60809.1 snowies	239.	45118.2	60923.5 snowies, snapper
205.	45113.7	60118.0 snowies	240.	45118.2	60918.4 snapper, grouper, porgies
206.	45113.9	60917.7 snapper, grouper, porgies	241.	45118.2	60921.6 hang
207.	45114.1	60909.5 snapper, grouper, porgies	242.	45118.3	60925.0 snapper, B-liners (large ledge, good fish marks)
208.	45115.2	60913.5 snapper, grouper, porgies	243.	45118.5	60930.0 snowies, snapper
209.	45115.6	60903.9 snapper, porgies	244.	45118.5	60896.9 snapper, grouper, porgies
210.	45116.0	60804.3 snowies	245.	45118.7	60927.8 snapper, grouper, porgies
211.	45116.0	60804.0 snowies, greytile	246.	45118.7	60922.1 snapper, grouper, porgies
212.	45116.0	60903.5 grouper, porgies, B-liners	247.	45118.9	60914.0 snapper, grouper, porgies
213.	45116.4	60905.0 grouper	248.	45119.3	60946.0 porgies
214.	45116.4	60809.1 snowies, greytile	249.	45119.3	60927.2 ledge
215.	45116.4	60809.0 snowies, greytile	250.	45119.4	60768.8 snowies, greynile
216.	45116.6	60907.6 hang	251.	45119.6	60909.7 snapper, grouper, porgies
217.	45116.7	60902.7 snapper, grouper, porgies (hang)	252.	45119.8	60910.3 snapper, grouper, porgies
218.	45116.7	60912.7 snapper, grouper, porgies	253.	45120.0	60904.6 snapper, grouper, porgies
219.	45116.7	60916.2 snowies			
220.	45116.8	60418.9 goldens			
221.	45116.8	60918.9 snapper, grouper, porgies			
222.	45116.8	60921.1 snapper, grouper, porgies			

	Y	Z	Notes		Y	Z	Notes
254.	45120.3	60908.4	snapper, grouper, porgies	288.	45133.1	60854.4	snapper, grouper, porgies
255.	45120.5	60908.7	snapper, grouper, porgies	289.	45133.2	60886.8	snapper
256.	45120.6	60822.1	goldens	290.	45133.4	60891.3	snapper, grouper, porgies
257.	45122.9	60904.9	snapper, porgies	291.	45133.6	60891.0	large ledge, good fish marks on top
258.	45124.1	60815.1	snowies, greytile (hang)	292.	45133.9	60872.6	snapper, grouper
259.	45124.1	60806.7	good fish marks on echo sounder	293.	45134.4	60840.6	snapper, grouper, porgies
260.	45124.2	60809.3	snowies, greytile	294.	45134.5	60918.0	hang
261.	45124.5	60932.6	black seabass	295.	45134.5	60877.9	snapper, porgies
262.	45124.9	60806.9	snowies, goldens	296.	45134.5	60877.0	snapper, grouper
263.	45125.7	60800.9	snowies, greytile	297.	45134.6	60858.4	good fish marks on echo sounder
264.	45126.5	60898.0	snowies, goldens	298.	45135.0	60840.0	snapper, grouper, porgies
265.	45126.7	60803.6	hang	299.	45135.3	60832.6	snapper, grouper, porgies
266.	45127.3	60940.3	good fish marks on echo sounder	300.	45135.5	60879.6	snapper, grouper
267.	45127.6	60937.4	grouper	301.	45136.0	60843.2	snapper, grouper, porgies
268.	45127.7	60941.0	hang	302.	45136.0	60840.0	snapper, grouper, porgies
269.	45128.0	60939.0	porgies	303.	45136.1	60833.9	snapper, grouper, porgies
270.	45128.0	60940.0	hang	304.	45136.2	60838.5	snapper, grouper, porgies
271.	45128.0	60882.4	snapper, grouper, porgies (a steep ledge here)	305.	45136.3	60659.8	wreck, hang
272.	45128.1	60346.4	goldens	306.	45136.4	60825.9	snapper, grouper, porgies
273.	45128.3	60882.3	snapper, grouper, porgies	307.	45137.0	60812.0	snowies
274.	45129.1	60937.8	black seabass	308.	45137.1	60841.5	good fish marks on echo sounder
275.	45129.4	60938.6	grouper	309.	45139.0	60845.9	snapper, grouper, porgies
276.	45129.6	60938.5	black seabass	310.	45139.0	60845.8	hang
277.	45129.6	60877.5	snapper, grouper, porgies	311.	45139.5	60843.1	snapper, grouper, porgies
278.	45130.0	60893.9	snapper, grouper, porgies	312.	45139.5	60846.2	hang
279.	45130.6	60899.4	snapper, grouper, porgies	313.	45139.7	60845.1	snapper, grouper, porgies
280.	45130.6	60786.7	snowies	314.	45139.8	60844.8	snapper, grouper, porgies
281.	45131.0	60897.0	large ledge called deli-ledge	315.	45139.8	60844.9	snapper, grouper, porgies
282.	45131.3	60905.8	snapper, grouper	316.	45139.9	60833.9	snapper
283.	45131.3	60839.3	snapper, grouper, porgies	317.	45140.1	60850.1	snapper, grouper, porgies, B-liners
284.	45131.5	60864.3	snapper, grouper, porgies				
285.	45132.0	60908.0	grouper				
286.	45132.5	60895.4	snapper, grouper, porgies				
287.	45133.0	60908.2	hang				

Y	Z	Notes
318.	45140.2 60855.1	grouper, porgies
319.	45141.1 60761.0	ledge with hard bottom
320.	45141.5 60836.6	snapper
321.	45141.7 60849.9	snapper, grouper, porgies
322.	45141.7 60827.3	greytile
323.	45141.9 60853.1	snapper, grouper, porgies
324.	45142.0 60860.0	snapper, grouper, porgies
325.	45142.8 60835.7	snapper, grouper, porgies
326.	45143.0 60842.1	snapper, grouper, porgies
327.	45143.1 60833.4	snapper, grouper, porgies
328.	45143.3 60829.2	snapper, grouper, porgies
329.	45143.3 60838.9	snapper, grouper, porgies
330.	45143.5 60824.5	greytile
331.	45143.7 60828.5	hang (hard bottom with good fish marks)
332.	45143.8 60828.5	hang, hard bottom
333.	45145.8 60821.8	snapper, grouper, porgies
334.	45145.9 60829.4	ledge, good fish marks (area called the sow pen)
335.	45146.0 60833.6	snapper, grouper, porgies
336.	45146.4 60787.9	snapper, grouper, porgies
337.	45146.6 60827.7	(area called the sow pen) snapper, grouper
338.	45146.7 60824.0	snapper, grouper, porgies
339.	45146.7 60827.0	snapper, grouper, porgies
340.	45148.4 60825.8	snapper, grouper, porgies
341.	45148.9 60823.7	snapper, grouper
342.	45149.9 60802.9	hang
343.	45150.0 60825.0	hang
344.	45150.1 60812.0	hang
345.	45150.3 60810.7	snapper, grouper, porgies

Y	Z	Notes
346.	45151.9 60859.4	rock shrimp
347.	45152.1 60814.6	snapper, grouper
348.	45152.4 60947.4	hang
349.	45154.0 60947.9	snapper, grouper
350.	45154.1 60944.8	hard bottom
351.	45154.4 60948.4	hang
352.	45154.4 60889.4	hang
353.	45155.0 60946.0	snapper, B-liners
354.	45155.1 60949.1	black seabass
355.	45155.3 60946.6	black seabass
356.	45155.9 60949.4	black seabass
357.	45157.6 60944.6	hang
358.	45157.6 60946.0	hang
359.	45158.0 60945.4	hang
360.	45158.6 60951.3	black seabass
361.	45158.7 60952.4	black seabass
362.	45171.8 61541.0	snapper
363.	45172.6 59888.9	snapper
364.	45174.4 60758.6	porgies, B-liners (good fish marks)
365.	45175.0 60600.0	large ledge (50-foot ridge, good fish marks)
366.	45175.0 60698.0	snapper, grouper, B-liners, porgies
367.	45176.4 60776.6	good fish marks
368.	45177.1 60944.2	rock shrimp
369.	45182.2 60981.2	rock shrimp
370.	45182.4 60796.2	rock shrimp
371.	45183.0 61529.0	black seabass
372.	45183.8 61516.5	(a single 3-foot ledge) (Brunswick Snapper Banks)
373.	45188.0 61541.3	(a 6- to 10-foot ledge) (Brunswick Snapper Banks)
374.	45189.0 61554.0	grouper, porgies
375.	45191.3 61525.4	rough bottom on Brunswick Snapper Banks
376.	45193.7 60729.7	grouper
377.	45194.1 60728.7	black seabass
378.	45194.7 60358.6	snapper
379.	45198.3 60193.1	snapper
380.	45198.5 60176.4	snapper
381.	45198.6 60459.3	snapper (23 fathoms deep)

Y	Z	Notes
382.	45202.0 60512.0	large ledge
383.	45205.7 60540.8	large ledge
384.	45217.0 61033.0	rock shrimp
385.	45221.9 61024.1	goldens
386.	45229.6 61058.0	snapper, grouper, porgies
387.	45274.0 61254.9	snapper, grouper
388.	45274.2 61052.6	snapper, grouper, porgies
389.	45278.0 61255.0	snapper, grouper, porgies
390.	45282.3 61232.4	snapper, grouper, porgies
391.	45283.1 61241.6	snapper, grouper
392.	45284.0 61227.6	B-liners, porgies
393.	45284.5 61155.2	good fish marks on paper machine
394.	45284.9 61233.1	snapper, grouper, porgies (Grand Banks area)
395.	45285.2 61228.3	B-liners
396.	45285.2 61230.9	snapper, grouper, porgies, B-liners
397.	45285.3 61234.7	snapper, grouper, porgies (Grand Banks area)
398.	45286.0 61225.8	snapper, grouper, porgies
399.	45286.5 61240.5	snapper, grouper, porgies
400.	45287.2 61226.7	black seabass
401.	45287.9 61232.4	snapper, grouper, porgies
402.	45288.0 61249.0	snapper, grouper, porgies
403.	45288.0 61245.0	snapper, grouper, porgies
404.	45288.3 61225.6	snapper, grouper, porgies (Grand Banks area)
405.	45289.3 61221.1	black seabass
406.	45290.0 61233.1	snapper
407.	45290.1 61233.0	black seabass
408.	45290.2 61255.2	snapper, porgies
409.	45290.8 61249.0	black seabass
410.	45291.0 61246.8	black seabass
411.	45291.2 61244.6	snapper

Y	Z	Notes
412.	45291.2 61233.2	hang (slab rock coral and sponges)
413.	45291.4 61233.4	hang (slab rock coral and sponges)
414.	45291.7 61231.3	B-liners
415.	45291.7 61233.7	snapper
416.	45292.2 61254.2	snapper, black seabass
417.	45292.3 61236.5	snapper, grouper, porgies
418.	45292.6 61234.7	snapper, grouper, porgies
419.	45293.1 61240.0	B-liners
420.	45293.3 61226.8	black seabass
421.	45293.4 61242.4	snapper, grouper, porgies
422.	45293.4 61226.8	snapper, porgies
423.	45293.4 61258.4	snapper, grouper, porgies
424.	45293.5 61248.1	snapper, grouper, porgies
425.	45294.5 61248.8	B-liners
426.	45294.5 61233.1	snapper, grouper, porgies
427.	45295.0 61242.0	B-liners
428.	45295.2 61252.7	grouper, B-liners
429.	45296.3 61228.8	black seabass
430.	45296.7 61239.1	B-liners
431.	45296.8 61238.6	B-liners
432.	45297.7 61240.2	snapper, grouper, porgies
433.	45298.0 61230.0	B-liners
434.	45298.0 61221.0	snapper, grouper, porgies
435.	45299.0 61254.1	snapper
436.	45299.3 61248.1	snapper
437.	45300.4 61241.1	hang (rock, coral, and sponges) (Grand Banks)
438.	45301.0 61245.0	snapper, grouper, porgies
439.	45306.0 61160.0	hard bottom
440.	45310.1 61159.5	black seabass
441.	45337.1 61199.5	black seabass
442.	45337.9 61191.5	black seabass