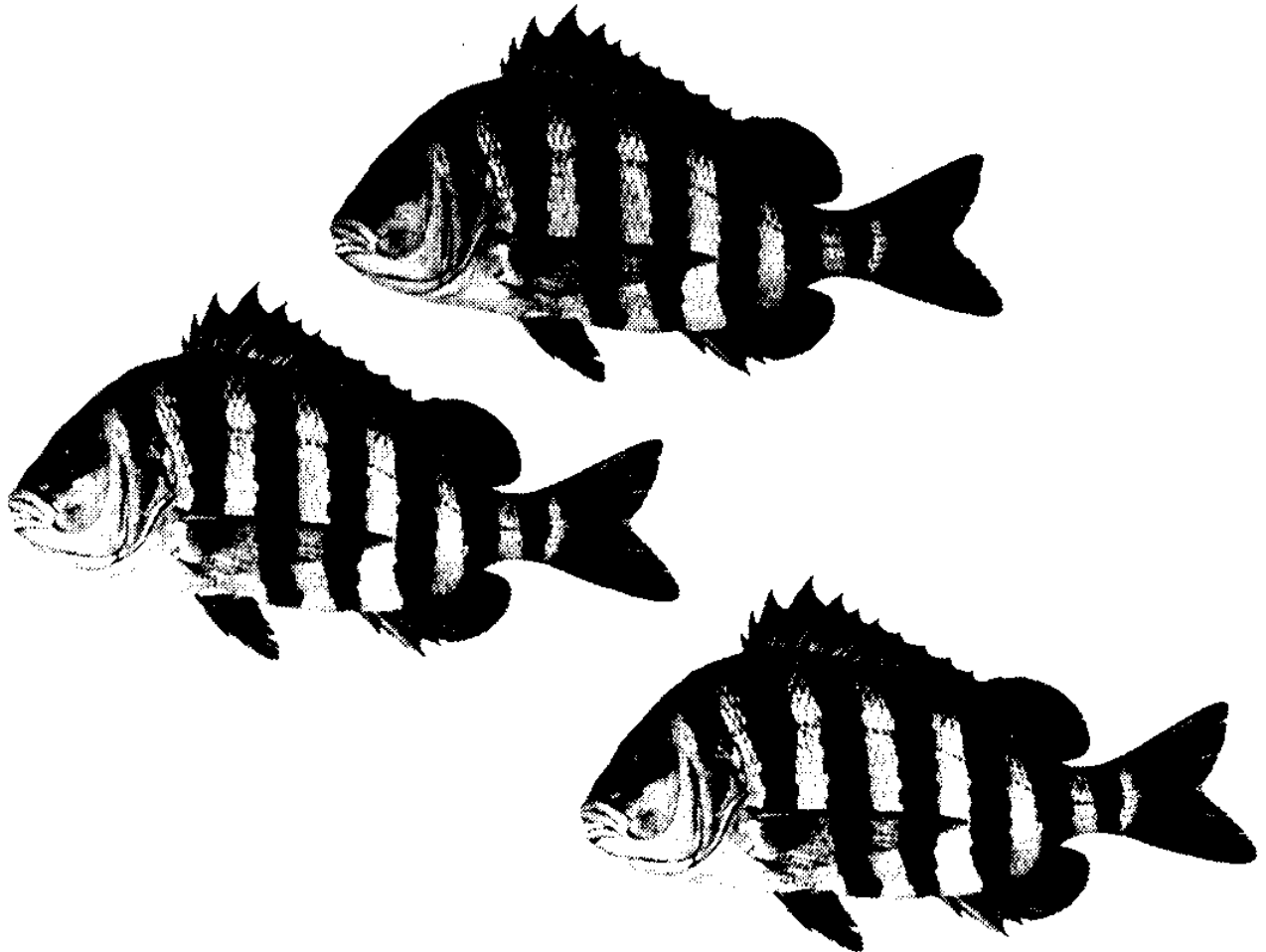


Louisiana Sea Grant College Program

Fish Trawling in Louisiana Inshore Waters

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**LOUISIANA
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LOUISIANA STATE UNIVERSITY AGRICULTURAL CENTER

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INTRODUCTION

As shrimp catches per vessel become smaller with more boats in the fishery, alternatives are becoming necessary to maintain profitability. Trawling for fish is a logical choice, since very little vessel modification is necessary and few gear changes are required. Markets for sheepshead and black drum have greatly increased in recent years; during the fall of 1987, these fish brought an average of \$0.20 per pound and \$0.60 per pound, respectively. The additional income is especially helpful at the end of a poor shrimping season. Fish trawl catches improve as fish school during colder weather.

Trawling is traditionally conducted off the northeast and northwest coasts of the United States and in European waters for cod, haddock, hake, and other bottomfish. Such trawls are constructed with large-mesh webbing for the wings and the front of the trawl body, with a smaller mesh through the rest of the trawl. This reduces drag, allowing greater net speed over the bottom without excessive fuel consumption.

The purpose of this trawling project was to experiment with different mesh sizes and trawl designs and compare efficiency with the trawl developed by Noel Usannaz of New Orleans for use in the Lake Borgne area of southeast Louisiana. In 1983, Usannaz began using a 4-seam fish trawl made primarily of 4" stretch mesh to catch sheepshead and black drum. The experimental trawls used in this project included the following.

1. Trawls of the same design, made of 5" and 6" webbing, in order to help eliminate undersized sheepshead (10" and less)
2. A bibbed trawl of the same design and mesh size
3. A 2-seam design of the same mesh size
4. The same design with greater headrope flotation

METHODS

Vessel Description

The vessel used for the project was the *Gros Comme Ca*, from the port of New Orleans. The 56-foot wooden double-rigger was powered with a 671 Detroit diesel with a 3.75 gear reduction, using a 38 x 33 5-blade propeller. The vessel's beam was 20 feet wide with a 4-foot draft. Deck equipment and rigging were standard for inshore shrimping, with 42-foot outriggers. At 1650 rpm, the estimated speed was 3 knots for each tow during the project.

Gear Description

The gear used to pull the trawls during the project was standard for shrimp trawl use. The bridles were 3/8" cable, 160 feet long, and were used as warps from the outriggers for each tow during the project. The wooden doors were 5' x 30"; although the middle board is sometimes removed to reduce drag during fish trawling, it remained for this project. A 1/4" tickler chain (30" shorter than the leadline) was used to increase crab bycatch for extra income, although it is not necessary for fish trawling. Each net used during the project had a 115-foot lazyline of 1/2" polydacron rope.

Nets. All mesh sizes noted are stretch measurements. The standard trawl used for comparison was a 4-seam, semiballoon design. The wings, top, sides, and bottom panels were made of 4"-#15 nylon webbing. The extension was made of 1 3/4"-#15 nylon webbing. The bag was made of 4"-#60 plastic webbing. The headrope was 25 feet long, 1/2" polydacron rope, with five 4" urethane floats. The leadline was 33 feet long, 1/2" polydacron rope, with 1/4" chain hung 15 links for each 12 hangings (6 hangings on each side of leadline center). The leg ropes between the trawl and the doors were 10 feet. The G-strings between the headrope and leadline were 10 feet long.

Trawls with 5" and 6" webbing followed the same 4-seam design, except that the extension and bag webbing sizes remained the same.

The bib or tab used for two of the trials was made of 2"-#15 nylon webbing and was sewn to the trawl two mesh-rows behind the headrope.

The construction of the 2-seam trawl was made from the same materials as the 4-seam trawl (Figures 1 and 2).

The extra headrope flotation added during the project consisted of urethane floats measuring 10" long and 22" round (circumference). During trial #3, one float was placed on the headrope just before each wing. During trial #4, two floats were added on to the front of each wing during the first three tows.

FISHING TECHNIQUES

The trawls were fished in a normal shrimping fashion for double-rigging. After each 1-1/2 hour tow, the nets were retrieved until the boards reached the ends of the outriggers, at which time the speed was increased to wash the catch to the back of the trawl. The catches from each side of the vessel were separately weighed onboard and recorded. A 16-foot test trawl was used off the port side but its catch was not included in the total catch of that side. The size ranges of the fish were periodically recorded. Small sheepshead (under 12" long) and bycatch were weighed and counted before being returned to the water.

RESULTS AND DISCUSSION

As with shrimping, tuning the standard 4-seam fish trawls was conducted so that both trawls would be performing equally prior to comparing other webbing sizes and designs. During trial #1, the starboard trawl's tickler chain was found to be too short, after results showed a 32% higher sheepshead catch on the port side. This was reduced to 10% during trial #2 after the adjustment (Tables 1 and 2).

Extra headrope flotation was compared during trials #3 and #4. Trial #3 showed a 16% higher sheepshead catch with the extra flotation, but trial #4 was reversed, with a 4% higher catch with the standard trawl. Data from tow #1 were not used because of gear fouling. There was a substantially higher black drum catch during both trials with the extra flotation on the starboard side--20% higher during trial #3 and 60% higher during trial #4 (Tables 3 and 4). Generally, fish catch by trawls increases as the headrope height increases. This may have been the case with black drum on the starboard side. The drum catch of tow #3 during trial #4 is particularly noticeable.

Although a double-rigged vessel was used, there is no absolute guarantee that both sides were equal with equal gear, since vessel turning and the schooling capabilities of fish

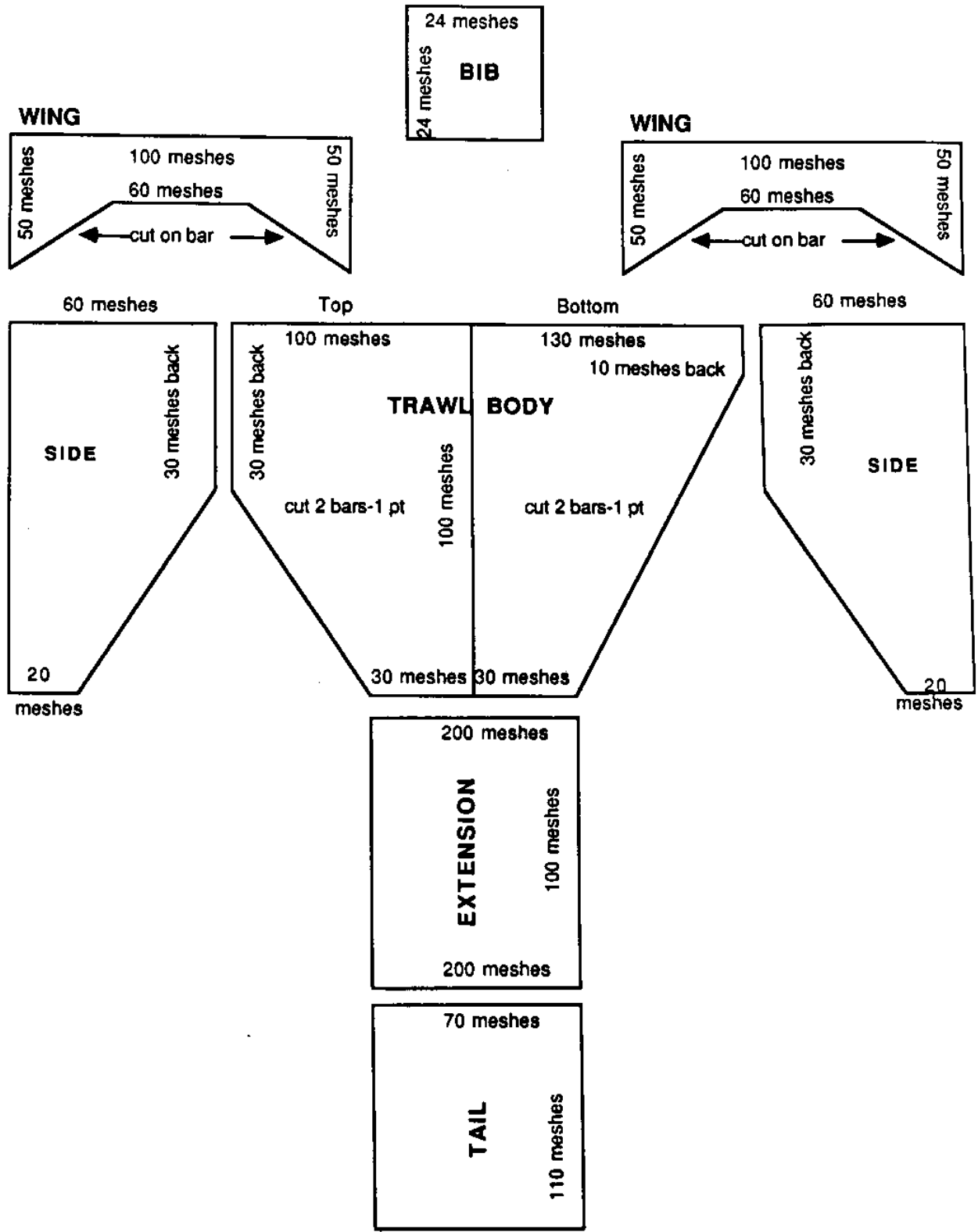


Figure 1. Four-seam trawl schematic.

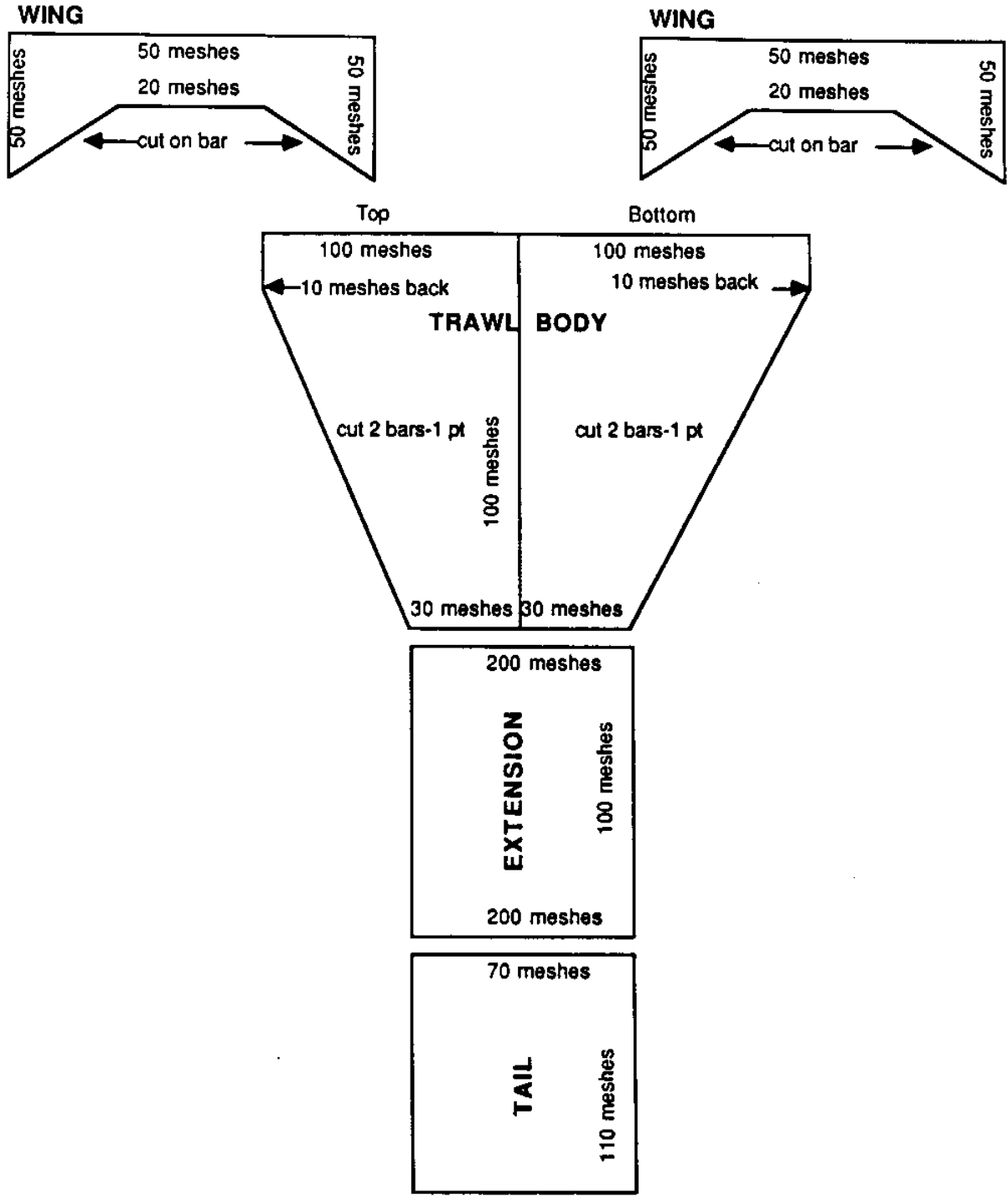


Figure 2. Two-seam trawl schematic.

can influence the catch. Double-rigged vessels in shallow water are considered to have less of an impact on a trawl's catch, however, than a single-rigged vessel.

Different trawl designs were compared during trials #5 and #6. During both trials, the standard 4-seam trawl on the port side caught more than the starboard 2-seam trawl--24% higher during trial #5 and 18% higher during trial #6. Two-seam fish trawls are considered to be ideal (personal communication, Jim Barrett, National Marine Fisheries Service, Pascagoula), though in this case the 4-seam trawl proved superior.

Different mesh sizes were used during the trials #7 through #10. Both trawls were 4-seam designs, but the starboard trawl was built of either 5" or 6" webbing in the wings and trawl body. The port-side trawl with 4" webbing caught more fish during every two in all four trials, probably because the fish were caught by their gills in the 5" and 6" webbing. The larger webbing was used in an attempt to eliminate small sheepshead from the catch, but they were gilled along with larger sheepshead and other fish.

A bib was used with a 4-seam trawl during trials #11 and #12 on the starboard side. Although bibbed trawls generally catch more fish, this design did not appear to do so. No consistent difference occurred between the two trawls.

OTHER RESULTS

The highest catches during the project were 20-40 lbs. of sheepshead and black drum, produced by 30-minute test trawls. The test trawl catch commonly contained shrimp, croakers, mullet, stingrays, menhaden and other herring-like species. The resulting fish trawl bycatch consisted mainly of stingrays, mullet, and small sheepshead. Very few, if any, shrimp, spotted seatrout, red drum or other commercial species were caught by the fish trawls, although these species were often found in the test trawl catch. This is remarkably different from shrimp trawling, making fish trawls extremely efficient gear.

Through the course of the project, weather conditions were noted, including wind speed and direction, water color, temperature, and salinity. While trawling in shallow inshore waters, it appeared that single-rigged vessels performed better than double-rigged vessels in muddier waters. A higher percentage of black drum was caught in muddy water. Colder waters produced better results. The water temperature in Lake Borgne during the colder period of this study was 41° F, and the salinity was 10 parts per thousand, or about 30% seawater.

OTHER TRAWLS AND METHODS USED

Other trawls and methods were used on vessels operating nearby during this project. Flat 50-foot shrimp trawls and Mongoose shrimp trawls with or without a 4" mesh bag were used. All of these trawls reportedly caught fish, but ones with small mesh bags had much larger bycatches. Also, fuel consumption may have been greater with the increased drag of the smaller webbing. Faster speeds and longer warps also produced good results.

CONCLUSIONS

Over the 12 trawling days, 28,040 lbs. of salable fish were caught, including test trawl catch. The total sheepshead catch was 25,618 lbs. and the black drum catch was 2,422

lbs. At prices of \$0.20 for sheepshead and \$0.60 for black drum, over \$6,500 was earned, not including the sale of a small amount of crab and mullet bycatch.

Catching fish during colder weather, when the inshore shrimp season is nearly over, helped 12 vessel operators and their crews in Louisiana's Lake Borgne area salvage a below-average trawling season, allowing many of them economic survival through the following winter.

TABLE 1. Trial #1, October 30, 1987

	STARBOARD SIDE (standard 4", 4-seam trawl)	PORT SIDE (standard 4", 4-seam trawl)
TOW #1	346 lbs. sheepshead 8 lbs. black drum	859 lbs. sheepshead 15 lbs. black drum
bycatch	14 lbs. small sheepshead 13 lbs. stingrays 2 lbs. spot	39 lbs. small sheepshead 26 lbs. stingrays 2 lbs. spot 7 lbs. mullet

TOW #2	813 lbs. sheepshead 20 lbs. black drum	1075 lbs. sheepshead 21 lbs. black drum
bycatch	35 lbs. small sheepshead 1/2 lb. stingrays 1 pinfish 1 hardened catfish 1 menhaden 1 spot	63 lbs. small sheepshead 1/2 lb. stingrays 1 pinfish 1 mullet 2 cigarfish

TOW #3	312 lbs. sheepshead 29 lbs. black drum	688 lbs. sheepshead 13 lbs. black drum
bycatch	26 lbs. small sheepshead 3 mullet 2 spot 1 sea robin 1 croaker	48 lbs. small sheepshead 2 mullet 3 spot 1 hardhead catfish 1 croaker 3 pinfish 3 southern puffer

TOW #4	229 lbs. sheepshead 4 lbs. black drum	701 lbs. sheepshead 10 lbs. black drum
bycatch	15 lbs. small sheepshead 2 lbs. stingrays 3 spot 1 southern flounder 1 hardhead catfish	37 lbs. small sheepshead 2 lbs. stingrays 7 spot 1 sand seatrout (4") 1 mullet 1 red drum (16")

Total crab catch for Trial #1 was 132 lbs.

TABLE 2. Trial #2, November 18, 1987

	STARBOARD SIDE (standard 4", 4-seam trawl)	PORT SIDE (standard 4", 4-seam trawl)
TOW #1	50 lbs. sheepshead 42 lbs. black drum	23 lbs. sheepshead 22 lbs. black drum
bycatch	5 stingrays 2 southern flounders 1 croaker 1 shrimp	6 stingrays 1 southern flounder 1 hardhead catfish 1 red drum (12")

TOW #2	108 lbs. sheepshead 56 lbs. black drum	150 lbs. sheepshead 61 lbs. black drum
bycatch	69 lbs. small sheepshead 10 stingrays 2 southern flounders 1 shrimp 1 croaker	60 lbs. small sheepshead 16 stingrays 1 southern flounder 1 shrimp 1 croaker 1 menhaden 1 hardhead catfish 3 red drum (23", 14", 14")

TOW #3	71 lbs. sheepshead 41 lbs. black drum	111 lbs. sheepshead 51 lbs. black drum
bycatch	82 lbs. small sheepshead 1 mullet 1 southern kingfish 1 red drum (15")	82 lbs. small sheepshead 3 mullet 1 sea robin 1 spotted seatrout (15") 1 shrimp 2 spot 4 stingrays

Total crab catch for Trial #2 was 191 lbs.

TABLE 3. Trial #3, November 20, 1987

	STARBOARD SIDE (4", 4-seam trawl with extra headrope flotation)	PORT SIDE (standard 4", 4-seam trawl)
TOW #1	55 lbs. sheepshead 85 lbs. black drum	35 lbs. sheepshead 55 lbs. black drum
bycatch	103 lbs. small sheepshead 10 stingrays	90 lbs. small sheepshead 6 stingrays

TOW #2	11 lbs. sheepshead 28 lbs. black drum	8 lbs. sheepshead 11 lbs. black drum
bycatch	10 lbs. small sheepshead 12 stingrays	19 lbs. small sheepshead 4 stingrays

TOW #3	420 lbs. sheepshead 105 lbs. black drum	310 lbs. sheepshead 80 lbs. black drum
bycatch	110 lbs. small sheepshead 4 stingrays	80 lbs. small sheepshead 4 stingrays

TOW #4	305 lbs. sheepshead 22 lbs. black drum	210 lbs. sheepshead 20 lbs. black drum
bycatch	22 lbs. small sheepshead 4 stingrays	40 lbs. small sheepshead 8 stingrays

TOW #5	120 lbs. sheepshead 8 lbs. black drum	100 lbs. sheepshead 8 lbs. black drum
bycatch	50 lbs. small sheepshead 8 stingrays	40 lbs. small sheepshead 8 stingrays

TABLE 4. Trial #4, November 23, 1987

	STARBOARD SIDE (4", 4-seam trawl with extra headrope flotation)	PORT SIDE (standard 4", 4-seam trawl)
TOW #1	461 lbs. sheepshead 10 lbs. black drum	948 lbs. sheepshead 73 lbs. black drum
bycatch	34 lbs. small sheepshead 2 mullet 2 menhaden 3 stingrays	63 lbs. small sheepshead 3 mullet 2 menhaden 10 stingrays

The starboard trawl and boards during tow #1 were fouled with a gill net

TOW #2	178 lbs. sheepshead 12 lbs. black drum	229 lbs. sheepshead
bycatch	30 lbs. small sheepshead 7 stingrays 3 mullet 1 croaker	30 lbs. small sheepshead 7 stingrays 1 mullet 1 sea robin

TOW #3	493 lbs. sheepshead 303 lbs. black drum	470 lbs. sheepshead 63 lbs. black drum
bycatch	53 lbs. small sheepshead 5 stingrays 1 sea robin 1 croaker 1 spotted seatrout (8")	63 lbs. small sheepshead 8 stingrays 1 spot 4 mullet 1 sand seatrout (8")

TOW #4	583 lbs. sheepshead 31 lbs. black drum	617 lbs. sheepshead 22 lbs. black drum
bycatch	60 lbs. small sheepshead 8 stingrays 1 mullet 1 spotted seatrout (5") 1 menhaden	76 lbs. small sheepshead 6 stingrays 2 mullet 1 spotted seatrout (5")

Total crab catch for Trial #4 was 120 lbs.

TABLE 5. Trial #5, November 27, 1987

	STARBOARD SIDE (4", 2-seam trawl)	PORT SIDE (standard 4", 4-seam trawl)
TOW #1	131 lbs. sheepshead	353 lbs. sheepshead
bycatch	12 stingrays 1 spotted seatrout (5") 1 menhaden 1 southern kingfish	8 stingrays 1 spotted seatrout (6")

TOW #2	219 lbs. sheepshead	337 lbs. sheepshead
bycatch	6 lbs. small sheepshead 6 menhaden 6 mullet 1 flounder 16 stingrays	1 sea robin 1 menhaden 2 mullet 1 spot 4 stingrays

TOW #3	124 lbs. sheepshead	102 lbs. sheepshead
	1 lb. small sheepshead 10 stingrays 7 mullet	1 lb. small sheepshead 5 stingrays 5 mullet

Total crab catch for Trial #5 was 90 lbs.

TABLE 6. Trial #6, December 1, 1987

	STARBOARD SIDE (4", 2-seam trawl)	PORT SIDE (standard 4", 4-seam trawl)
TOW #1	116 lbs. sheepshead 8 lbs. black drum	143 lbs. sheepshead 26 lbs. black drum
bycatch	5 mullet 4 stingrays 5 lbs. small sheepshead	10 mullet 8 stingrays 2 lbs. small sheepshead

TOW #2	117 lbs. sheepshead	171 lbs. sheepshead
bycatch	2 mullet 5 stingrays	1 mullet 5 stingrays

TOW #3	6 lbs. sheepshead	33 lbs. sheepshead 16 lbs. black drum
bycatch	2 stingrays	4 stingrays

TABLE 7. Trial #7, December 12, 1987

	STARBOARD SIDE (5", 4-seam trawl)	PORT SIDE (standard 4", 4-seam trawl)
TOW #1	197 lbs. sheepshead 17 lbs. black drum	264 lbs. sheepshead 59 lbs. black drum
bycatch	5 stingrays	4 stingrays

TOW #2	219 lbs. sheepshead	233 lbs. sheepshead 3 lbs. black drum
bycatch	8 stingrays	5 stingrays

TOW #3	341 lbs. sheepshead 2 lbs. black drum	485 lbs. sheepshead 6 lbs. black drum
bycatch	6 stingrays	6 stingrays

TOW #4	277 lbs. sheepshead 20 lbs. black drum	288 lbs. sheepshead 35 lbs. black drum

TABLE 8. Trial #8, December 13, 1987

	STARBOARD SIDE (5", 4-seam trawl)	PORT SIDE (standard 4", 4-seam trawl)
TOW #1	191 lbs. sheepshead 37 lbs. black drum	234 lbs. sheepshead 27 lbs. black drum
bycatch	20 lbs. stingrays	30 lbs. stingrays

TOW #2	309 lbs. sheepshead 35 lbs. black drum 25 lbs. bycatch	430 lbs. sheepshead 29 lbs. black drum 10 lbs. bycatch

TOW #3	320 lbs. sheepshead 13 lbs. black drum 7 lbs. bycatch	372 lbs. sheepshead 20 lbs. black drum 5 lbs. bycatch

TOW #4	148 lbs. sheepshead 5 lbs. black drum 10 lbs. bycatch	219 lbs. sheepshead 30 lbs. black drum 15 lbs. bycatch

TABLE 9. Trial #9, December 14, 1987

	STARBOARD SIDE (6", 4-seam trawl)	PORT SIDE (standard 4", 4-seam trawl)
TOW #1	159 lbs. sheepshead 15 lbs. black drum 10 lbs. bycatch	194 lbs. sheepshead 25 lbs. black drum 20 lbs. bycatch
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TOW #2	233 lbs. sheepshead 10 lbs. black drum 25 lbs. bycatch	304 lbs. sheepshead 17 lbs. black drum 30 lbs. bycatch
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TOW #3	66 lbs. sheepshead 6 lbs. black drum 40 lbs. bycatch	80 lbs. sheepshead 10 lbs. black drum 35 lbs. bycatch

TABLE 10. Trial #10, December 17, 1987

	STARBOARD SIDE (6", 4-seam trawl)	PORT SIDE (standard 4", 4-seam trawl)
TOW #1	268 lbs. sheepshead 20 lbs. black drum 13 lbs. bycatch	335 lbs. sheepshead 35 lbs. black drum 10 lbs. bycatch
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TOW #2	322 lbs. sheepshead 60 lbs. black drum	421 lbs. sheepshead 60 lbs. black drum
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TOW #3	186 lbs. sheepshead 65 lbs. black drum	204 lbs. sheepshead 71 lbs. black drum

TABLE 11. Trial #11, December 26, 1987

	STARBOARD SIDE (4", 4-seam trawl with bib)	PORT SIDE (standard 4", 4-seam trawl)
TOW #1	314 lbs. sheepshead 15 lbs. black drum	302 lbs. sheepshead 12 lbs. black drum

TOW #2	100 lbs. sheepshead 12 lbs. black drum	174 lbs. sheepshead 5 lbs. black drum

TOW #3	192 lbs. sheepshead 15 lbs. black drum	184 lbs. sheepshead 15 lbs. black drum

TABLE 12. Trial #12, December 31, 1987

	STARBOARD SIDE (4", 4-seam trawl with bib)	PORT SIDE (standard 4", 4-seam trawl)
TOW #1	358 lbs. sheepshead 30 lbs. black drum 30 lbs. mullet	323 lbs. sheepshead 25 lbs. black drum 30 lbs. mullet

TOW #2	435 lbs. sheepshead 35 lbs. black drum	417 lbs. sheepshead 27 lbs. black drum

TOW #3	400 lbs. sheepshead 30 lbs. black drum	433 lbs. sheepshead 30 lbs. black drum