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National Marine Fisheries Service
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Pascagoula Facility
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Small Pelagics Trawl Survey
NOAA Ship CHAPMAN 91-02 (42)

INTRODUCTION

The NOAA Ship CHAPMAN departed Pascagoula, MS on 4/3/91 to evaluate a 90-ft small pelagics bottom trawl. Two survey areas included the coastal waters off Tampa Bay, FL and the De Soto Canyon area off NW Florida (Figure 1). An experiment was conducted to compare catches made by the 90-ft trawl with catches by the 123-ft Shuman bottom trawl. The cruise was divided into 3 legs totaling 36 sea days.

OBJECTIVES

1. Compare catch of 90-ft small pelagics trawl with 123-ft Shuman bottom trawl.
2. Collect environmental data at all trawl locations.
3. Provide samples of target species for seafood technology experiments.

METHODS

Gear - The 90-ft small pelagics trawl measured 90 feet on the headrope and 107 feet on the footrope (Figure 2). Mesh size of the trawl gradually reduced from 8-inch stretch mesh in the wings and leading meshes of the trawl body, to 2-inch mesh just ahead of the 3.75-inch mesh codend. The codend contained a 7/8-inch mesh liner. A 1.25-inch mesh fish funnel was attached at the start of the 2-inch webbing in the trawl body. The headrope was floated with twenty-four 10-inch CIES floats with 17 pounds (1b) of floatation each. A 9/16-inch cable with 3-inch rubber cookies was suspended by 12-inch drop chains from the footrope to serve as ground gear. The 90-ft trawl was fished with 4.5 M² "V" doors and 30 fm scissor bridles.

The Shuman trawl measured 123 feet at the headrope and mesh size ranged from 31.5 inches at the fishing circle to 1.25 inches at the codend. The trawl was also fitted with a funnel constructed of webbing and attached at intermediate net. The funnel tapered into the tailpiece of the trawl. The Shuman trawl was rigged with

a 9-ft by 3-ft center headrope kite and eight 11-inch floats attached to each wing. Ground gear was constructed of 3.5-inch rubber disks hung on 12-inch drops. The Shuman trawl was fished with 4 M² Super "V" doors.

A net sonde was mounted on the headrope to monitor the trawl opening and trawl depth.

The net sonde was not deployed for most hauls because numerous marine mammals were observed at many of the survey sites before trawling began. There is reason to believe that the animals may be sensitive to the acoustic signal and are attracted to the trawl resulting in their capture.

Environmental data collected at each trawl site included temperature and salinity profiles with a STD, surface chlorophyll, and surface, midwater and near-bottom dissolved oxygen measurements from water samples collected with Niskin bottles.

EXPERIMENTAL DESIGN

The 90-ft and 123-ft trawls required the use of different trawl doors and bridles of different lengths. To change trawls, both the doors and bridles had to be swapped and this limited the trawl comparison experiment to fishing only a single trawl-door combination on a given day.

Experimental blocks were defined by depth with 7 trawling sites selected at random points for each block. Each site was fished with a 90-ft trawl and a 123-ft trawl on alternate days. All tows were 30 minutes long. Catches were sorted, species identified, enumerated, weighed and measured for length. Large catches were subsampled following established procedures. Data were recorded on station sheets with the consecutive tow number used to identify a station. A sample site number was designated and consisted of the block and tow number within the block.

RESULTS

West Florida off Tampa Bay.

Seventy five trawl sites were sampled in the coastal waters adjacent to Tampa Bay, FL in 11-25 fm (Table 1). Thirty-eight hauls were completed using the 90-ft net and 37 hauls using the 123-ft net. Spanish sardine mixed with round scad and round scad mixed with round herring were the primary species captured by the 90-ft trawl; while the 123-ft trawl yielded largely round herring mixed with round scad.

The maximum catch rates for spanish sardine, round herring and round scad were 331, 282 and 230 Kg. per 0.5 hr haul by the 90-ft trawl (730, 622 and 507 pounds). The maximum catch rates by the 123-ft net were 55, 120 and 186 Kg. (121, 265 and 410 pounds) respectively.

A comparison of the catches between the two trawl types fishing the same site within each experimental block showed that the average catch was higher for the 90-ft trawl in 4 of the 5 blocks for which sufficient data were available. The average catch was higher for the 123-ft trawl in the remaining block.

Spanish sardine were distributed throughout the 520 sq. mi. survey area located between 13-25 fm approximately 21-44 nautical mi. WSW of Tampa Bay, FL. Sardine occurred in 27 hauls out of a total of 33 with the 90-ft small pelagics trawl (Figure 3). The estimated total number of sardines captured was 38,255. Seventy-three percent of the total catch was within a 35 sq. mi. area located 36-44 n. mi. WSW of Cortez, FL near Tampa Bay in 21-25 fm where trawling yielded between 2,200-9,200 fish per 0.5 hr haul (stations 2-4; 17-19 and 26 (Table 1). Samples consisted of two modal size groups 14 cm and 17 cm. These catches occurred at the time when sardine schools were absent from the traditional purse seine grounds near Tampa Bay.

NORTHWEST FLORIDA

Forty-five trawl sites were sampled in the waters of northwest Florida northeast of the De Soto Canyon in 59-108 fm (Table 1). Twenty-four hauls were completed using the 90-ft net and 21 hauls using the 123-ft net. Gulf butterfish mixed with round herring were the major species caught in the 90-ft and 123-ft trawls. The maximum catch rates for butterfish and herring by the 90-ft trawl were 691 and 976 Kg per 0.5 hr (1,523; 2,152 pounds). The maximum yields for each species by the 123-ft trawl were 540 and 509 Kg (1,190; 1,122 pounds) respectively.

A comparison of the catches between the two trawl types fishing the same site within each experimental block revealed that the average catch was higher for the 90-ft trawl in 3 of the 5 blocks surveyed during the experiments. The average catch was approximately the same for both trawl types in one block and was higher for the 123-ft trawl in the remaining block.

Gulf butterfish and round herring predominated in 59-79 fm. Butterfish modal sizes were 11-14 cm FL. Significant catches of round herring occurred in 78-86 fm with modes of 13 and 14 cm. Catches decreased sharply between 91-108 fm where rough scad predominated at modal sizes of 17 and 18 cm.

Samples of spanish sardine, round herring and round scad were frozen for morphometric, meristic and chemical studies by Florida Marine Research Institute personnel.

Information regarding the capture location of spanish sardine and round herring was provided to the Florida Marine Research Institute to support the aerial/acoustic clupeid survey.

The scientific staff wish to congratulate the Captain and vessel crew for their excellent assistance and cooperation.

Approximately 170 pounds of spanish sardine round herring and round scad were processed on board ship by the seafood technologist for product research.

CRUISE PARTICIPANTS (NOAA only):

LEG 1 (04/03/91 - 04/15/91):

<u>Name</u>	<u>Title</u>	<u>Lab Represented</u>
Charles Roithmayr	Chief Scientist	MS Laboratories
James A. Barrett	FMES	MS Laboratories
Mark Grace	Fishery Biologist	MS Laboratories
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LEG 2 (04/17/91 - 04/29/91):

<u>Name</u>	<u>Title</u>	<u>Lab Represented</u>
Charles Roithmayr	Chief Scientist	MS Laboratories
Gladys Reese	Fishery Biologist	MS Laboratories
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LEG 3 (05/01/91 - 05/10/91):

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Mark Grace	Chief Scientist	MS Laboratories
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SUBMITTED BY:

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DATE: 1/5/92

Table 1. CHAPMAN CRUISE 91-02 trawl station and species composition data; April - May 1991.

STA	SITE	LATITUDE	LONGITUDE	DEPTH FM	GEAR ¹	CATCH Kg ²	DOMINANT SPECIES	% CATCH
<u>West Florida off Tampa Bay</u>								
01	101	27° 23.92'	83° 33.05'	25	90	126	spanish sardine round scad	31.7 19.6
02	102	27° 22.11'	83° 31.09'	23	90	447	spanish sardine round scad	38.5 10.9
03	103	27° 18.09'	83° 29.51'	24	90	288	round scad spanish sardine	32.4 30.7
04	104	27° 16.61'	83° 30.04'	24	90	267	spanish sardine round scad	49.7 19.3
05	105	27° 15.29'	83° 29.08'	24	90	83	orange filefish knobbed porgy	22.7 16.2
06	101	27° 23.64'	83° 32.49'	23	123	274	round scad	13.1
07	102	27° 22.18'	83° 31.15'	23	123	118	round scad	27.9
08	103	27° 17.68'	83° 28.67'	23	123	104	round scad	30.3
09	104	27° 16.60'	83° 30.04'	24	123	505	vermilion snapper	7.6
10	106	27° 09.60'	83° 26.23'	24	123	114	vermilion snapper spanish sardine round scad	39.5 11.6 16.0
11	201	27° 08.86'	83° 20.51'	22	123	285	round scad spanish sardine	42.8 5.6
12	202	27° 12.09'	83° 21.19'	22	123	185	vermilion snapper	51.5
13	203	27° 13.83'	83° 23.84'	22	123	190	vermilion snapper round scad	19.9 9.0
14	204	27° 16.56'	83° 22.55'	22	123	354	round scad spanish sardine	33.0 15.5
15	205	27° 21.02'	83° 35.59'	23	123	65	orange filefish	37.2
16	201	27° 09.10'	83° 21.50'	23	90	86	orange filefish vermilion snapper	16.4 15.5

¹ trawl headrope width in feet² Kg per 30 minute haul; 1 Kg = 2.2046 pounds

Table 1. (Continued)

STA	SITE	LATITUDE	LONGITUDE	DEPTH FM	GEAR ¹	CATCH Kg ²	DOMINANT SPECIES	% CATCH
<u>West Florida off Tampa Bay</u>								
17	202	27° 11.83'	83° 20.89'	22	90	355	spanish sardine round scad round herring vermilion snapper	45.5 27.8 4.5 15.8
18	203	27° 14.00'	83° 24.12'	22	90	483	spanish sardine round scad vermilion snapper	68.6 15.0 5.1
19	204	27° 16.51'	83° 27.51'	22	90	279	spanish sardine round scad	34.6 23.6
20	205	27° 21.04'	83° 25.63'	22	90	0	vermilion snapper	13.6
21	301	27° 26.59'	83° 24.34'	21	90	96.5	spanish sardine sheepshead porgy round scad	32.0 25.9 17.9
22	301	27° 26.77'	83° 24.37'	21	90	43.5	spanish sardine round scad	21.6 15.4
23	302	27° 23.70'	83° 21.88'	20	90	12.2	clearnose skate	54.1
24	303	27° 18.41'	83° 18.31'	20	90	193.4	round scad spanish sardine	36.7 16.1
25	304	27° 14.93'	83° 18.01'	20	90	316.6	round herring	89.0
26	305	27° 11.75'	83° 17.75'	20	90	198.1	spanish sardine round scad	53.9 35.3
27	306	27° 10.86'	83° 15.00'	20	90	255.8	round scad round herring vermilion snapper	41.9 17.9 16.4
28	301	27° 26.91'	83° 24.43'	20	123	39.5	silver jenny orange filefish	42.1 21.6
29	302	27° 23.90'	83° 22.05'	20	123	26.8	scrawled cowfish orange filefish	19.4 17.2

¹ trawl headrope width in feet² Kg per 30 minute haul; 1 Kg = 2.2046 pounds

Table 1. (Continued)

STA	SITE	LATITUDE	LONGITUDE	DEPTH FM	GEAR ¹	CATCH Kg ²	DOMINANT SPECIES	% CATCH
<u>West Florida off Tampa Bay</u>								
30	303	27° 19.27'	83° 19.34'	20	123	381.8	round scad vermilion snapper	48.7 4.2
31	304	27° 15.21'	83° 18.29'	20	123	132.6	round herring round scad orange filefish vermilion snapper	32.1 24.4 16.1 15.8
32	305	27° 13.72'	83° 18.99'	21	123	161.4	round scad vermilion snapper	60.0 13.0
33	306	27° 12.45'	83° 16.21'	19	123	121.8	tomtate round scad vermilion snapper	27.4 24.3 21.2
34	401	27° 27.56'	83° 20.00'	19	123	311.1	round scad vermilion snapper lane snapper	34.0 17.2 10.9
35	402	27° 25.10'	83° 19.27'	18	123	47.4	orange filefish	51.5
36	403	27° 22.10'	83° 18.07'	18	123	135.2	vermilion snapper orange filefish scrawled cowfish	26.8 19.9 9.5
37	404	27° 19.75'	83° 15.50'	18	123	368.4	round herring round scad vermilion snapper	32.6 16.6 16.6
38	405	27° 16.81'	83° 14.20'	17	123	193.4	vermilion snapper orange filefish round scad	26.0 15.1 12.2
39	406	27° 14.22'	83° 11.88'	17	123	166.8	scrawled cowfish knobbed porgy	20.9 13.4
40	401	27° 28.64'	83° 20.58'	19	90	77.6	knobbed porgy orange filefish	36.7 20.1
41	402	27° 25.05'	83° 19.32'	18	90	36.9	orange filefish	74.6

¹ trawl headrope width in feet² Kg per 30 minute haul; 1 Kg = 2.2046 pounds

Table 1. (Continued)

STA	SITE	LATITUDE	LONGITUDE	DEPTH FM	GEAR ¹	CATCH Kg	DOMINANT SPECIES	% CATCH
<u>West Florida off Tampa Bay</u>								
42	403	27° 22.10'	83° 17.94'	19	90	147.7	round scad orange filefish	48.9 11.4
43	404	27° 19.80'	83° 15.48'	19	90	113.8	round herring	44.1
44	405	27° 16.61'	83° 13.89'	18	90	166.8	spanish sardine round scad	33.6 17.1
45	406	27° 14.37'	83° 12.16'	18	90	68.6	knobbed porgy	25.7
46	501	27° 07.44'	83° 05.44'	17	123	219.5	vermilion snapper round scad	25.5 11.9
47	502	27° 13.03'	83° 07.99'	17	123	97.0	round scad orange filefish vermilion snapper	31.7 20.4 15.5
48	503	27° 17.70'	83° 11.20'	16	123	100.2	orange filefish knobbed porgy vermilion snapper	16.1 14.1 13.5
49	504	27° 20.22'	83° 12.23'	16	123	8.4	orange filefish	90.5
50	505	27° 19.85'	83° 12.12'	16	123	193.0	orange filefish vermilion snapper knobbed porgy	26.0 11.4 10.9
51	501	27° 08.91'	83° 06.40'	17	90	242.9	spanish sardine orange filefish round scad	26.4 18.6 17.6
52	502	27° 11.61'	83° 07.17'	17	90	127.0	round scad	31.8
53	503	27° 16.18'	83° 10.39'	17	90	209.1	round scad	60.6
54	504	27° 18.60'	83° 12.06'	17	90	508.9	round scad	45.1
55	601	27° 07.67'	83° 00.02'	13	90	17.5	orange filefish	69.7
56	601	27° 07.59'	83° 00.03'	13	90	209.1	round scad	70.1

¹ trawl headrope width in feet² Kg per 30 minute haul; 1 Kg = 2.2046 pounds

Table 1. (Continued)

STA	SITE	LATITUDE	LONGITUDE	DEPTH FM	GEAR ¹	CATCH Kg ²	DOMINANT SPECIES	% CATCH
<u>West Florida off Tampa Bay</u>								
56	601	27° 07.59'	83° 00.03'	13	90	209.1	round scad	70.1
57	602	27° 11.82'	83° 03.02'	15	90	68.0	round scad orange filefish	39.8 37.1
58	603	27° 15.46'	83° 05.65'	15	90	91.2	orange filefish	38.1
59	604	27° 15.92'	83° 03.59'	13	90	150.4	knobbed porgy spanish sardine	26.3 17.4
60	605	27° 20.40'	83° 06.68'	14	90	111.0	round scad vermilion snapper	23.8 20.1
61	601	27° 08.00'	83° 00.23'	13	123	230.0	rougthead stingray	65.2
62	602	27° 12.11'	83° 03.05'	15	123	63.3	orange filefish	30.2
63	603	27° 15.41'	83° 05.73'	16	123	204.0	coral	77.8
64	603	27° 16.62'	83° 06.38'	14	123	434.1	coral	73.0
65	604	27° 17.46'	83° 04.46'	13	123	434.1	coral	78.3
66	702	27° 28.10'	83° 05.64'	13	123	315.7	sponge orange filefish vermilion snapper	20.1 10.0 10.0
67	703	27° 22.39'	83° 04.41'	13	123	172.1	tomtate vermilion snapper round scad	20.2 15.8 13.0
68	704	27° 19.67'	83° 02.06'	11	123	101.9	sponge orange filefish	33.4 20.1
69	705	27° 17.38'	83° 01.35'	11	123	61.2	orange filefish	37.9
70	706	27° 13.92'	82° 59.86'	13	123	96.5	sponge orange filefish	37.6 28.9
71	702	27° 27.76'	83° 05.48'	14	90	396.9	spanish sardine round scad	50.6 19.6

¹ trawl headrope width in feet² Kg per 30 minute haul; 1 Kg = 2.2046 pounds

Table 1. (Continued)

STA	SITE	LATITUDE	LONGITUDE	DEPTH FM	GEAR ¹	CATCH Kg ²	DOMINANT SPECIES	% CATCH
<u>West Florida off Tampa Bay</u>								
72	703	27° 22.46'	83° 04.43'	14	90	171.7	round scad spanish sardine	33.3 14.9
73	704	27° 19.76'	83° 02.19'	13	90	251.7	round scad spanish sardine	31.3 22.8
74	705	27° 16.76'	83° 01.01'	11	90	150.4	lane snapper orange filefish	24.2 15.1
75	706	27° 14.33'	83° 00.22'	12	90	193.0	rougthead stingray	85.7
<u>Northwest Florida</u>								
76	801	30° 01.86'	86° 55.29'	59	90	106.1	gulf butterfish rough scad	45.3 15.2
77	802	30° 59.96'	86° 52.70'	70	90	148.3	gulf butterfish	69.0
78	801	30° 01.51'	86° 54.91'	64	90	98.4	round herring gulf butterfish	27.9 13.7
79	802	29° 59.92'	86° 52.86'	69	90	578.3	round herring gulf butterfish	54.3 35.1
80	803	29° 58.81'	86° 49.34'	67	90	551.6	round herring gulf butterfish	47.8 38.0
81	804	29° 57.24'	86° 44.72'	64	90	370.1	gulf butterfish	73.1
82	801	30° 01.78'	86° 55.14'	64	123	132.5	longspine pogy gulf butterfish	28.1 21.9
83	802	29° 59.83'	86° 52.53'	69	123	322.1	round herring	66.8
84	803	29° 58.44'	86° 48.67'	63	123	343.4	gulf butterfish	50.8
85	804	29° 56.93'	86° 44.26'	64	123	177.1	longspine pogy gulf butterfish	44.6 22.8
86	901	29° 59.35'	86° 55.76'	74	90	1393.0	round herring gulf butterfish	70.1 20.7

¹ trawl headrope width in feet² Kg per 30 minute haul; 1 Kg = 2.2046 pounds

Table 1. (Continued)

STA	SITE	LATITUDE	LONGITUDE	DEPTH FM	GEAR ¹	CATCH Kg ²	DOMINANT SPECIES	% CATCH
<u>Northwest Florida</u>								
87	902	29° 57.36'	86° 53.68'	77	90	614.0	gulf butterfish	68.5
88	903	29° 54.00'	86° 49.48'	78	90	182.7	gulf butterfish round herring	37.8 27.7
89	904	29° 52.78'	86° 46.19'	74	90	536.8	gulf butterfish round herring	61.2 17.1
90	905	29° 15.33'	86° 42.19'	70	90	980.9	gulf butterfish round herring	70.4 23.2
91	902	29° 56.88'	86° 52.60'	77	123	135.1	round herring	87.8
92	903	29° 53.51'	86° 48.74'	78	123	109.0	round herring	58.6
93	904	29° 52.62'	86° 45.75'	74	123	1387.7	gulf butterfish round herring	38.9 36.7
94	905	29° 51.63'	86° 42.24'	70	123	305.9	pinfish round herring gulf butterfish	31.1 25.8 14.7
95	1001	29° 44.82'	86° 37.87'	78	123	494.1	gulf butterfish	79.1
96	1002	29° 45.52'	86° 42.54'	84	123	177.0	gulf butterfish round herring round scad	5.3 4.8 3.1
97	1003	29° 46.26'	86° 46.26'	85	123	515.5	round herring gulf butterfish	67.9 15.5
98	1004	29° 51.90'	86° 52.00'	86	123	91.4	round scad longspine porgy	39.9 15.3
99	1001	29° 44.93'	86° 37.85'	78	90	665.0	round herring gulf butterfish	48.7 43.6
100	1002	29° 45.54'	86° 26.63'	84	90	318.2	round herring	81.2
101	1003	29° 47.93'	86° 46.90'	84	90	665.5	round herring	91.6

¹ trawl headrope width in feet² Kg per 30 minute haul; 1 Kg = 2.2046 pounds

Table 1. (Continued)

STA	SITE	LATITUDE	LONGITUDE	DEPTH FM	GEAR ¹	CATCH Kg ²	DOMINANT SPECIES	% CATCH
<u>Northwest Florida</u>								
102	1004	29° 51.75'	86° 51.71'	86	90	214.8	round herring gulf butterfish	31.2 23.9
103	1101	29° 51.82'	86° 59.40'	95	90	86.1	round herring silver driftfish rough scad	54.9 14.8 14.0
104	1102	29° 49.72'	86° 52.91'	91	90	63.5	rough scad silver driftfish	45.8 8.6
105	1103	29° 47.05'	86° 52.71'	96	90	187.6	round herring rough scad gulf butterfish	68.0 12.1 7.2
106	1104	29° 46.58'	86° 49.89'	93	90	72.9	rough scad silver driftfish	41.3 12.2
107	1105	29° 43.72'	86° 48.32'	95	90	111.0	round herring	44.1
108	1101	29° 51.63'	86° 51.63'	95	123	79.7	rough scad silver driftfish	64.1 16.0
109	1102	29° 50.00'	86° 53.65'	92	123	132.6	rough scad chub mackerel	71.2 15.0
110	1103	29° 47.65'	86° 53.38'	97	123	39.8	rough scad	15.28
111	1104	29° 47.32'	86° 51.33'	94	123	137.9	round herring	69.6
112	1105	29° 45.31'	86° 49.45'	95	123	166.8	round herring round scad	50.2 29.7
113	1202	29° 47.16'	87° 00.66'	107	123	103.7	rough scad	16.3
114	1203	29° 45.94'	86° 58.16'	107	123	20.9	rough scad	19.1
115	1204	29° 45.70'	86° 53.72'	101	123	172.5	rough scad	93.2
116	1205	29° 41.86'	86° 50.81'	108	123	260.0	rough scad silver driftfish	56.3 12.0

¹ trawl headrope width in feet² Kg per 30 minute haul; 1 Kg = 2.2046 pounds

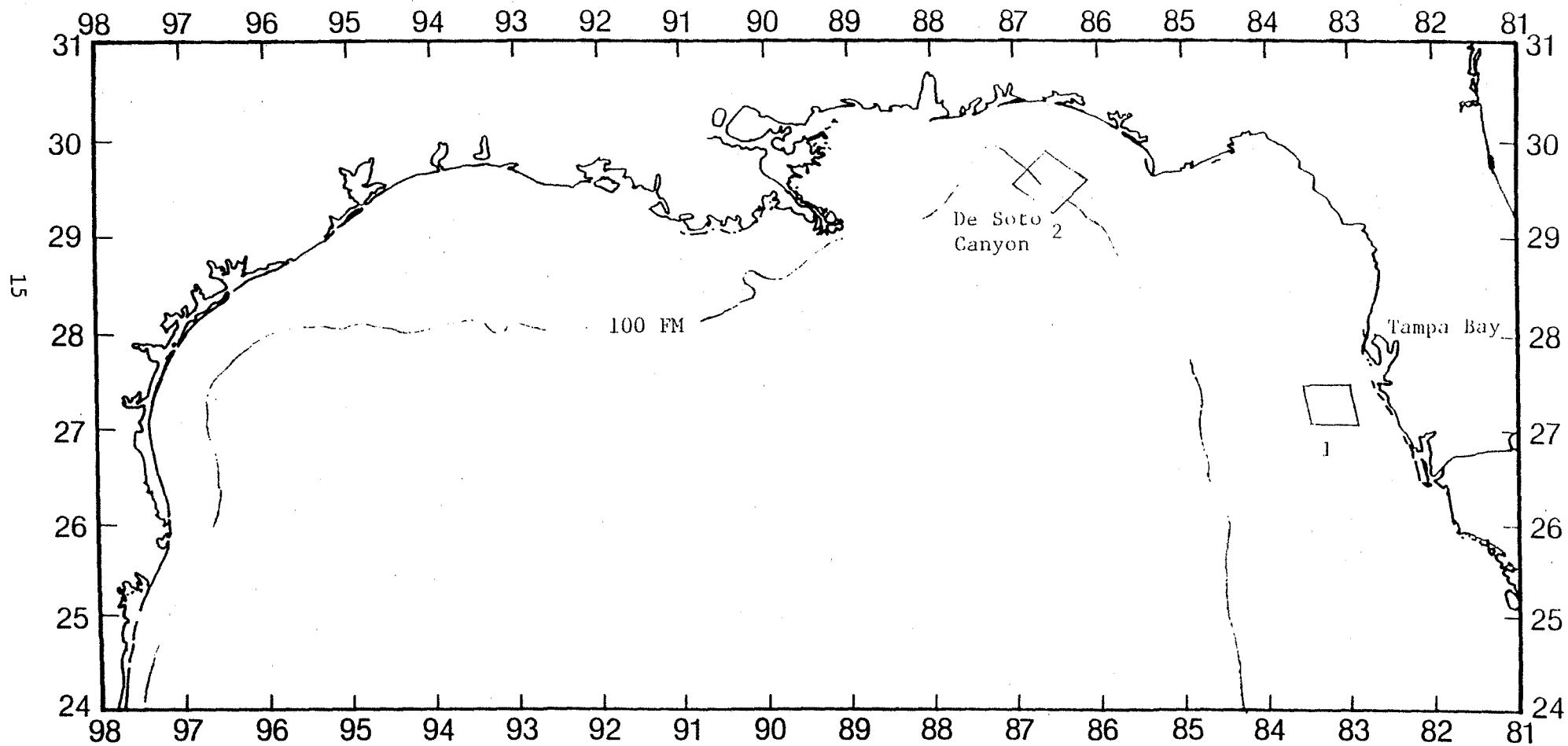
Table 1. (Continued)

STA	SITE	LATITUDE	LONGITUDE	DEPTH FM	GEAR ¹	CATCH Kg ²	DOMINANT SPECIES	% CATCH
<u>Northwest Florida</u>								
117	1202	29° 46.85'	87° 00.20'	107	90	23.6	rough scad	52.5
118	1203	29° 45.60'	86° 57.62'	107	90	13.3	rough scad	56.4
119	1204	29° 45.52'	86° 53.69'	102	90	36.2	rough scad	22.9
120	1205	29° 41.91'	86° 50.74'	108	90	97.1	rough scad	66.9

¹ trawl headrope width in feet

² Kg per 30 minute haul; 1 Kg = 2.2046 pounds

Figure 1. Small pelagic bottom trawl survey grounds, CH 91-02(42); 4/03 - 5/10/91. 1 denotes West Florida area near Tampa Bay; 2 denotes Northwest Florida near De Soto Canyon.



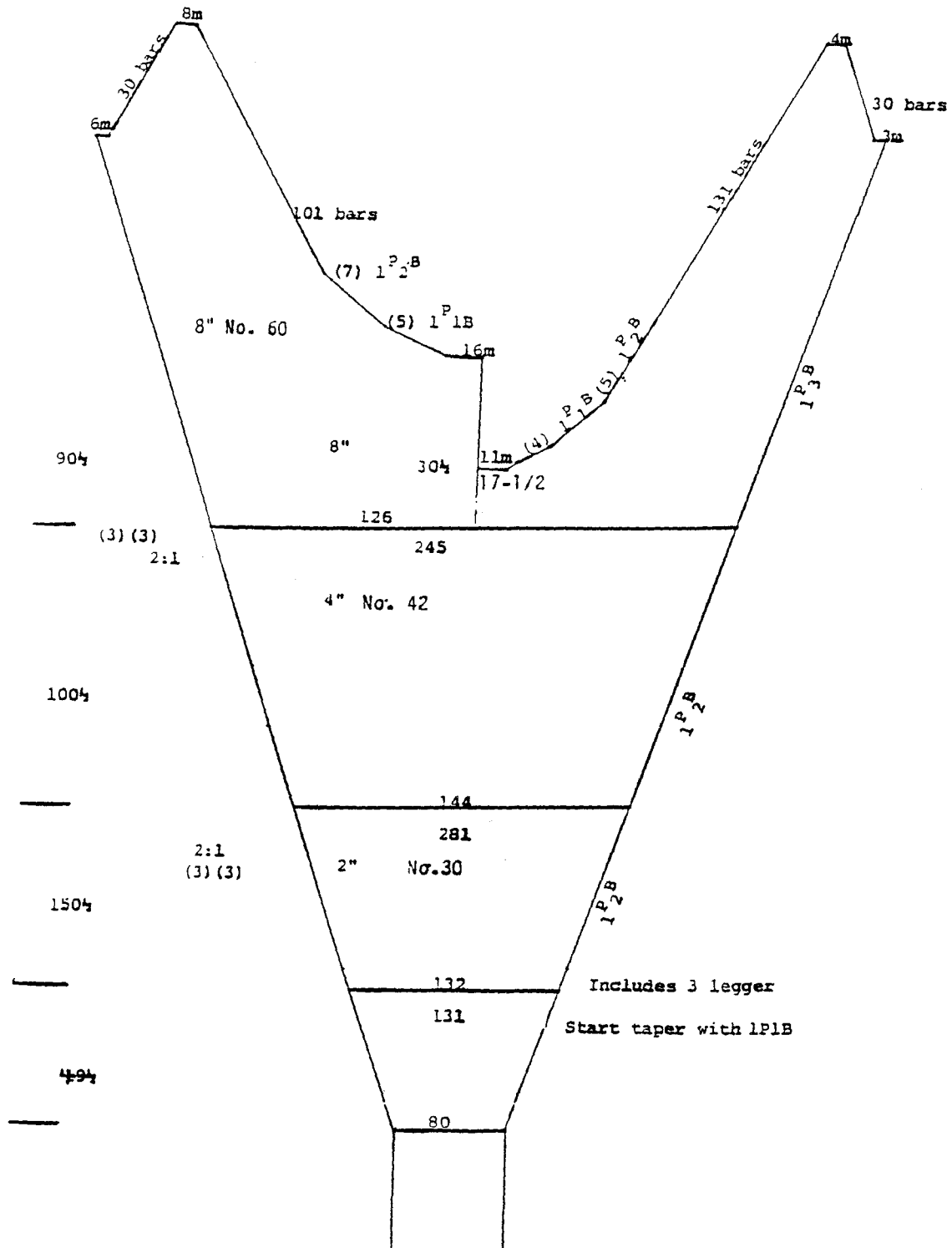


Figure 2. Diagram of 90-ft small pelagics trawl.

Figure 3. Positions of 27 stations where spanish sardine were captured with the 90-ft small pelagic trawl, CHAPMAN Cruise 91-02, April 1991.

