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Management Data Series Number 124
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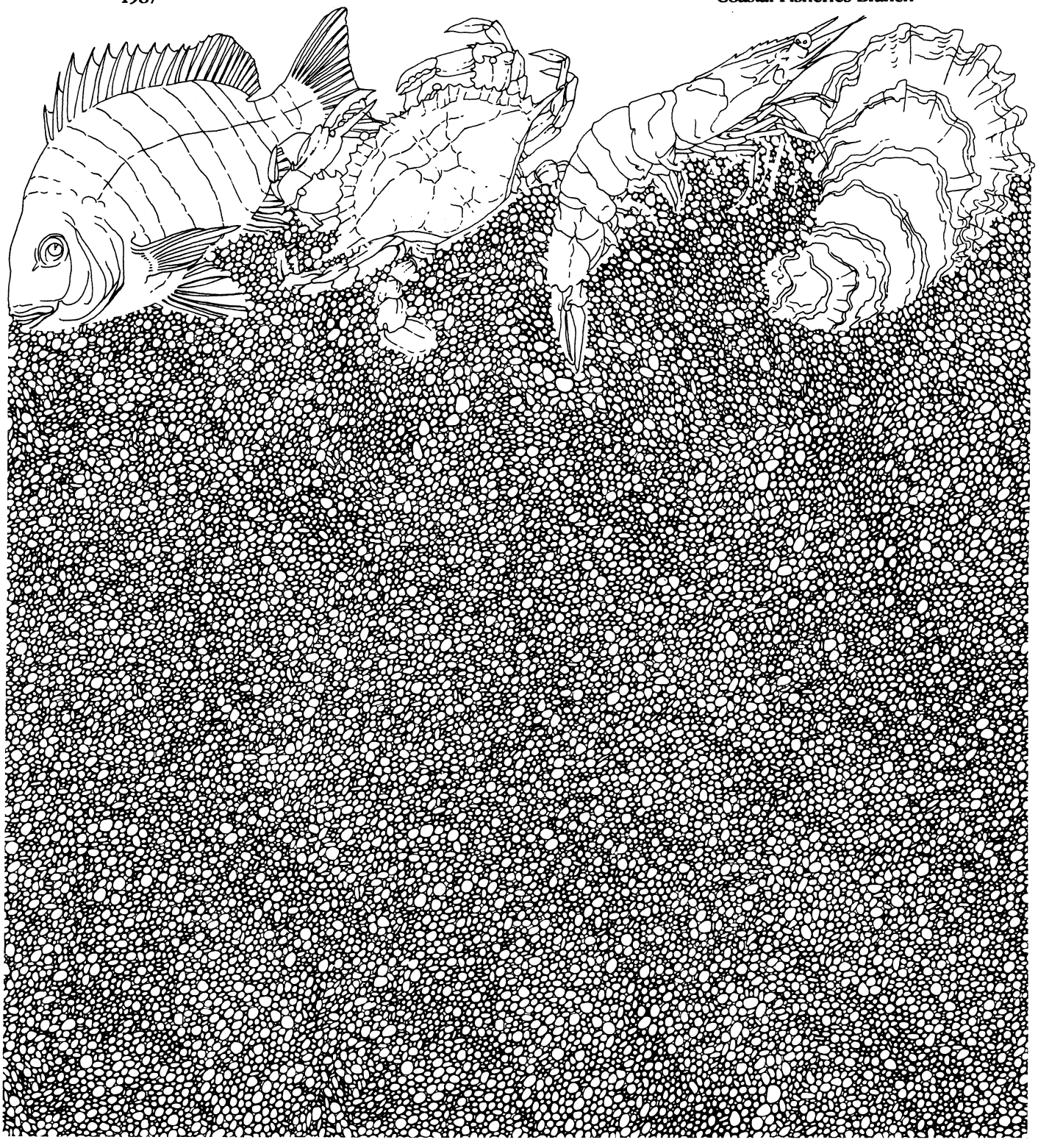

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ACKNOWLEDGMENTS

We would like to thank all Laguna Madre field personnel who diligently collected the samples. Al Green, Tom Heffernan, Ed Hegen, Lynn Benefield, Gary Saul, Hal Osburn and C. E. Bryan reviewed the manuscript.

ABSTRACT

Hardhead catfish (Arius felis) and red drum (Sciaenops ocellatus) dominated the catch on cut crab (Callinectes sp.), salted mullet (Mugil sp.), dead shrimp (Penaeus sp.) and oleander leaves (Nerium sp.). Top trotlines caught more fish than bottom trotlines. Fish hooked in the lip and mouth had a greater survival rate than did fish hooked elsewhere (gut, gill or exterior of fish). Spotted seatrout (Cynoscion nebulosus) had the lowest survival rate and the highest incidence of gut, gill and foul hooking. Minimal commercial trotlining during summer can be attributed to high bait predation and low black drum (Pogonias cromis) catches.

INTRODUCTION

Trotlines have accounted for the majority of the reported commercial finfish landings in the Laguna Madre since the early 1950's (Hamilton and Saul 1984, McEachron et al. 1985, Simmons and Breuer 1962). Initially, red drum (Sciaenops ocellatus) and spotted seatrout (Cynoscion nebulosus) were the target species (McEachron et al. 1980). The emphasis shifted to black drum (Pogonias cromis) in 1981 when the sale of red drum and spotted seatrout was prohibited (Osburn et al. 1985). Changes in target species precipitated changes in trotline techniques and baits.

Baits commonly used by commercial trotliners have been examined in previous Texas Parks and Wildlife Department (TPWD) trotline studies (McEachron et al. 1980, McEachron et al. 1985). Salted mullet (Mugil sp.) is used and has not been examined. Salted mullet is tougher than most natural baits and, according to commercial trotliners, is used primarily during summer months when bait scavenging is high.

This study was conducted to compare catches of top and bottom trotlines baited with salted mullet, crab (Callinectes sp.), oleander leaves (Nerium sp.) and dead shrimp (Penaeus sp.) during June, July and August, 1985 to determine on-line survival of fishes caught on trotlines and to test bait durability.

MATERIALS AND METHODS

A trotline study was conducted by the TPWD in the upper and lower Laguna Madre (Fig. 1) during February 1985-January 1986 (McEachron et al. 1987). Trotline descriptions are found in McEachron et al. (1985). Trotlines with circle hooks were fished overnight in two positions (Fig. 2): top (mainline on or just below surface) and bottom (mainline on or just above the bottom). Eight 100-hook trotlines were set three times each month in the upper and lower Laguna Madre during June-August 1985. Four bait types were used: crab, dead shrimp, oleander leaves and salted mullet. Fish taken off trotlines were identified to species (Hoese and Moore 1979) and counted. Up to 19 randomly selected individuals of each species were measured to the nearest mm (total length). Fish were recorded as alive or dead. Location of hook penetration was recorded as lip, mouth or elsewhere (gut, gill or exterior of fish). The number of baits left on hooks were recorded during each trotline pickup.

On-line survival (%) by bait type and position fished was determined for red drum, spotted seatrout and black drum by combining all catches for each species.

A catch rate (No./line h) for each of red drum, "others", and total fishes was computed for each trotline by dividing the number caught by the number of hours fished. Catch rates were transformed to $\log_{10}$ (catch rate +1) and analyzed using a three-factor fixed-effects model analysis of variance (AOV) with main effects of position (top and bottom), bait (crab, shrimp, leaves and salted mullet) and bay system (upper Laguna Madre and lower Laguna Madre).

A three-factor (bait, position and bay system) fixed-effects model AOV was used to determine if there were differences in the number of baits left after soak time.

Differences in main effects were evaluated with Duncan's multiple range test. However, when significant first-order interactions were found, comparisons were made within levels of the interacting factors using the mean square error from the AOV.

Total lengths of fish caught were analyzed by AOV with each measured fish length considered an observational unit of a trotline set. Sets were considered a random factor nested within fixed main effect combinations. The nested set effect mean square error is the appropriate error term for testing other effects when significant. Because not all sets caught fish and those that did catch fish usually caught unequal numbers the AOV provides approximate, rather than exact F tests. Length analyses could only be accomplished for red drum (position and bait) and spotted seatrout (top baits) in lower Laguna Madre because of missing cells and small sample size.

SAS procedures (SAS Institute, Inc. 1980, 1982) were used for all analyses; the significance level was $P \leq 0.05$. Mean catch rates from transformed data were back-transformed for tabular presentation (Elliott 1979).

RESULTS

Red drum, "others" and total fishes catch rates on simulated commercial trotlines varied between bay system, hook placement and among baits (Tables 1 and 2; Appendix A). Catch rates on top trotlines were approximately six times greater than on bottom trotlines for red drum. A significant first order interaction was found between position and bait for both "others" and total fishes (Table 2). Catch rates for "others" were significantly higher on top trotlines than bottom trotlines for both crab and shrimp, whereas catch rates on both leaves, and salted mullet were similar between top and bottom (Table 3). Total fishes catch rates were significantly higher on top trotlines than bottom trotlines for each

of crab, shrimp and leaves, whereas catch rates on salted mullet were similar between top and bottom. Catch rates for red drum were similar among baits. Significantly more red drum were caught in the lower Laguna Madre than in the upper Laguna Madre; "others" and total fishes catch rates were similar between bay systems (Table 2).

Mean lengths of red drum and spotted seatrout were similar between lower Laguna Madre top and bottom trotlines (Tables 4 and 5). Mean lengths of red drum were also similar among baits. Black drum mean lengths appeared to vary between position, bay systems and among baits but were not subjected to statistical analysis (Table 4).

Highest incidence of gut, gill and foul (exterior of fish) hooking occurred in spotted seatrout (Fig. 3). All black drum and most red drum (89.4%) were hooked inside the mouth (Fig. 4). Spotted seatrout suffered highest on-line mortality (Fig. 5). No black drum or red drum died on trotlines.

The number of baits left on trotlines after soak time were similar between positions and bay systems but were significantly different among baits (Table 6). Approximately 83% of all leaf baits were left on trotlines followed by crab with 73%, and salted mullet with 6%; no shrimp were left on trotlines (Appendix B).

Hydrological and meteorological parameters appeared similar between upper and lower Laguna Madre (Appendix B). Water temperature ranged from 25.0-30.5 C and salinities ranged from 28.0-42.7 o/oo.

DISCUSSION

Commercial trotlining during May-September is minimal (TPWD unpublished data). This study offers explanations as to why this is so: 1) bait loss during summer is extensive, 2) the catch of black drum is negligible and 3) the catch of non-retainable (mainly red drum) and less desirable species (mainly hardhead catfish) is high.

Martin et al. (1987) reported a relationship between survival rate and hooking location of trotline caught fish. High survival of red drum and black drum in this study corresponds to a predominance of lip and mouth hooking. Low spotted seatrout survival is attributed to extensive gut, gill and foul hooking.

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Table 1. Mean back-transformed catch rate (No./line ·h) and associated 95% confidence intervals of red drum, "other" and total fishes caught on top and bottom trotlines by bait and bay during June-August 1986. Numbers in parenthesis are lower and upper values for the 95% confidence intervals.

Category	Red drum	"Others"	Total
Position			
Top	0.1262 (0.0866-0.1672)	0.5632 (0.44314-0.6934)	0.6894 (0.5556-0.8347)
Bottom	0.0217 (0.0128-0.0306)	0.2943 (0.2130-0.3732)	0.3161 (0.2407-0.3961)
Bait			
Crab	0.0998 (0.0523-0.1494)	0.8139 (0.6059-1.0489)	0.9104 (0.6838-1.1674)
Shrimp	0.0440 (0.0192-0.0693)	0.2619 (0.1636-0.3686)	0.3056 (0.1971-0.4239)
Leaves	0.1094 (0.0474-0.1752)	0.0783 (0.0282-0.1308)	0.1862 (0.0987-0.2808)
Salted mullet	0.0425 (0.0199-00657)	0.5734 (0.4623-0.6931)	0.6162 (0.4974-0.7443)
Bay system			
Upper Laguna Madre	0.0408 (0.0173-0.0648)	0.4050 (0.3176-0.4981)	0.4466 (0.3555-0.5438)
Lower Laguna Madre	0.1067 (0.0731-0.1414)	0.4498 (0.3374-0.5715)	0.5551 (0.4274-0.6943)

Table 2. Summary of results of three-way analysis of variance of the mean log-transformed catch rate on top and bottom trotlines using bait types in the upper and lower Laguna Madre during June-August 1986.

Source of variation	df	Red drum		"Others"		Total	
		Sum of squares	F	Sum of squares	F	Sum of squares	F
Total	143	0.3809		2.5871		2.8321	
Position	1	0.0507	24.99 *	0.1793	17.45 *	0.3272	28.16 *
Bay system	1	0.0224	11.06 *	0.0006	0.06	0.0131	1.13
Position X Bay system	1	0.0036	1.78	0.0173	1.68	0.0217	1.87
Bait	3	0.0156	2.57	0.9103	29.54 *	0.8028	23.03 *
Position X Bait	3	0.0115	1.89	0.1173	3.80 *	0.1231	3.53 *
Bay system X bait	3	0.0137	2.25	0.0228	0.74	0.3150	0.90
Position X bay system X bait	3	0.0033	0.55	0.0245	0.74	0.0250	0.72
Error	128	0.2599		1.3150		1.4875	

*$P \leq 0.05$

Table 3. Back-transformed mean factor catch rates in the significant two way interaction of position X bait. Means followed by the same letter in the rows under each group of species are not significantly ($P > 0.05$) different. "Others" pertains to all fishes excluding red drum.

	"Others"		Total	
Bait	Top	Bottom	Top	Bottom
Crab	1.155 A	0.485 B	1.313 A	0.524 B
Shrimp	0.413 A	0.117 B	0.492 A	0.128 B
Leaves	0.155 A	0.003 A	0.359 A	0.020 B
Salted mullet	0.563 A	0.586 A	0.628 A	0.606 A

Table 4. Mean lengths (mm ± 1SE) of select species caught on top and bottom trotlines by bait in the upper and lower Laguna Madre during June-August 1986. ND = no data. Number in parenthesis is number measured.

Category	Red drum	Spotted seatrout	Black drum
Position			
Top	546 ± 10 (141)	476 ± 12 (38)	437 ± 24 (12)
Bottom	559 ± 20 (25)	566 ± 28 (5)	374 ± 13 (7)
Bait			
Crab	562 ± 13 (58)	445 ± 16 (5)	406 ± 16 (12)
Shrimp	512 ± 21 (25)	472 ± 18 (22)	339 ± 16 (2)
Leaves	555 ± 16 (63)	507 ± 22 (10)	548 ± 22 (2)
Salted mullet	534 ± 28 (25)	533 ± 33 (6)	410 (1)
Bay system			
Upper Laguna Madre	583 ± 17 (46)	460 ± 51 (2)	ND
Lower Laguna Madre	535 ± 10 (122)	487 ± 13 (41)	415 ± 17 (19)

Table 5. Summary of results of analysis of variance of mean lengths of red drum and spotted seatrout caught on trotlines in the lower Laguna Madre during June-August 1985.

Source of variation	Red drum			Spotted seatrout		
	df	Sum of squares	F	df	Sum of squares	F
Total	122	1665163		36	223131	
Position	1	9647	1.07	Not analyzed		
Bait	3	22756	0.84	3	6465	0.44
Position X bait	3	28538	1.05	Not analyzed		
Set (Position X bait)	35	815127	2.58 *	Not analyzed		
Set (bait)	Not analyzed			8	76792	1.95
Error	80	722429		25	122944	

*P $\leq$0.05

Table 6. Summary of analysis of variance of number of baits left on trotlines in the upper and lower Laguna Madre during June-August 1985.

Source of variation	df	Sum of squares	F
Total	142	46.9354	
Position	1	0.1709	2.90
Bay system	1	0.0824	1.40
Position X Bay system	1	0.0002	0.00
Bait	3	38.7297	219.38 *
Position X bait	3	0.1554	0.88
Bay system X bait	3	0.0663	0.38
Position X bay system X bait	3	0.1548	0.88
Error	127	7.4733	

*$P \leq 0.05$

Figure 1. Texas coast.

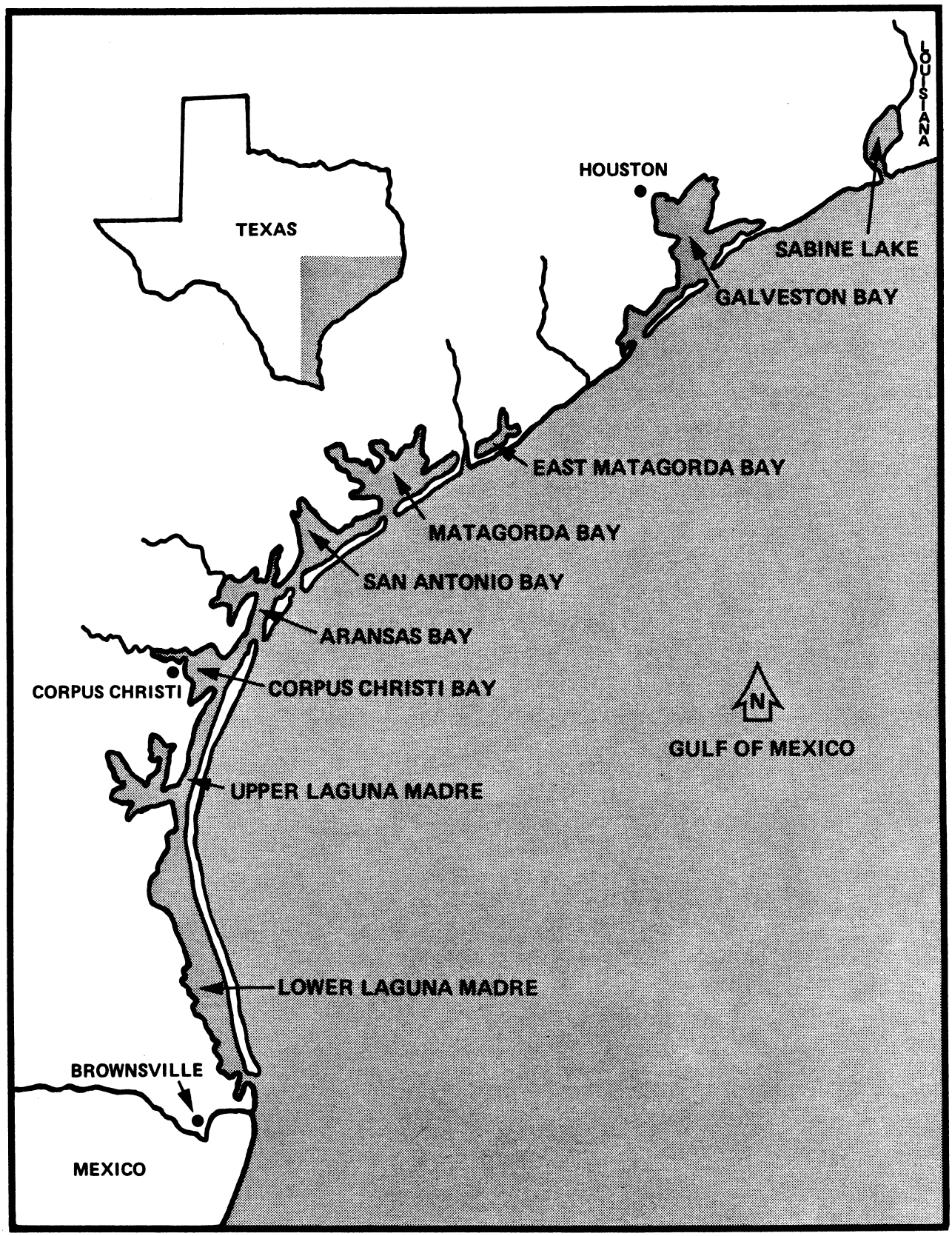
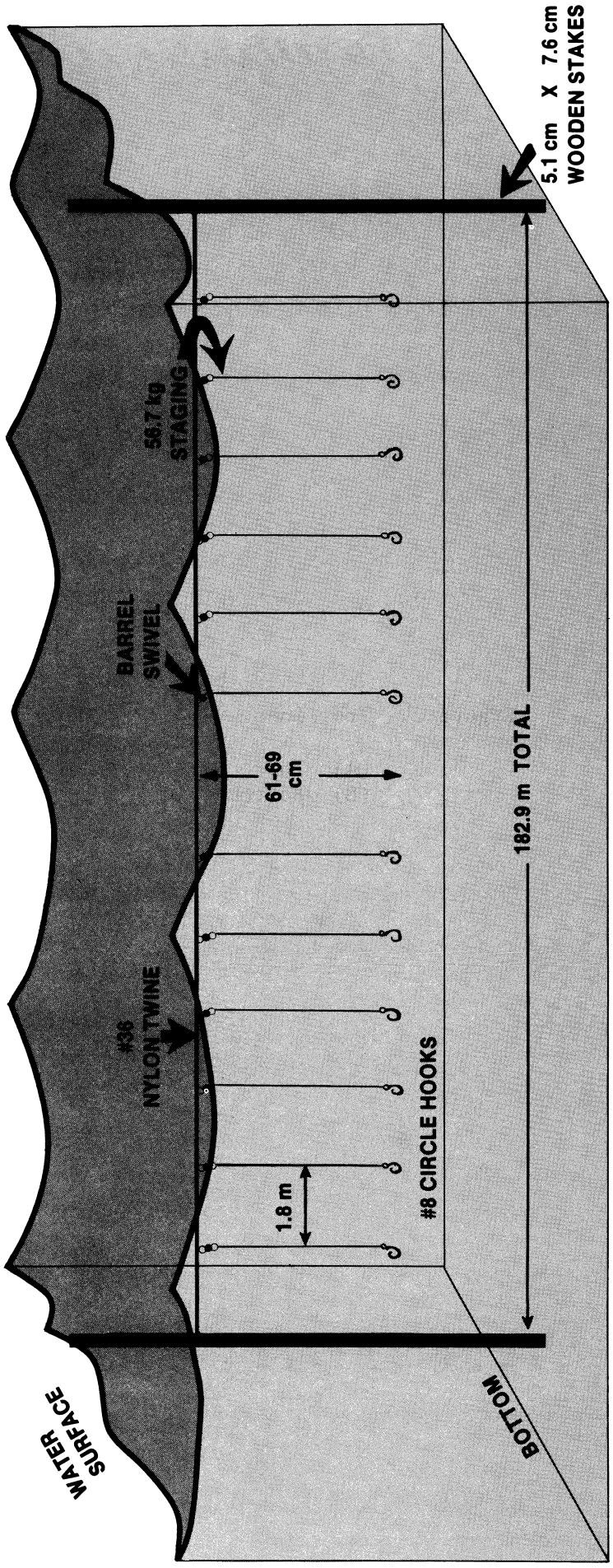
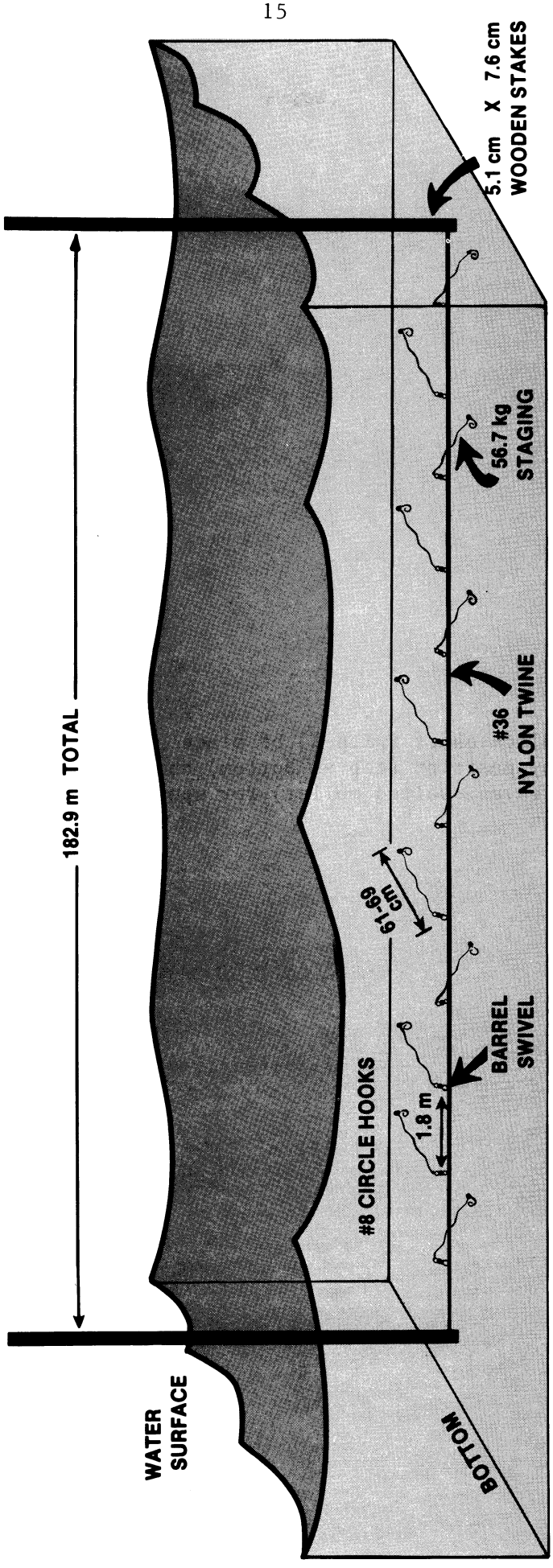

LOUISIANA
HOUSTON
TEXAS
SABINE LAKE
GALVESTON BAY
EAST MATAGORDA BAY
MATAGORDA BAY
SAN ANTONIO BAY
ARANSAS BAY
CORPUS CHRISTI
CORPUS CHRISTI BAY
N
GULF OF MEXICO
UPPER LAGUNA MADRE
LOWER LAGUNA MADRE
BROWNSVILLE
MEXICO

Figure 2. Trotlines.

(A) Top
(B) Bottom


5.1 cm X 7.6 cm
WOODEN STAKES
56.7 kg
STAGING
BARREL
SWIVEL
#36
NYLON TWINE
61-69
cm
182.9 m TOTAL
#8 CIRCLE HOOKS
1.8 m
WATER
SURFACE
BOTTOM

(A)


5.1 cm X 7.6 cm
WOODEN STAKES
56.7 kg
STAGING
#36
NYLON TWINE
182.9 m TOTAL
61-69 cm
BARREL
SWIVEL
#8 CIRCLE HOOKS
1.8 m
WATER
SURFACE
BOTTOM

(B)

Figure 3. Block chart (with %) of place hooked (lip, mouth, elsewhere) by position (top vs bottom) and bait (shrimp, crab, leaves, salted mullet) for spotted seatrout.

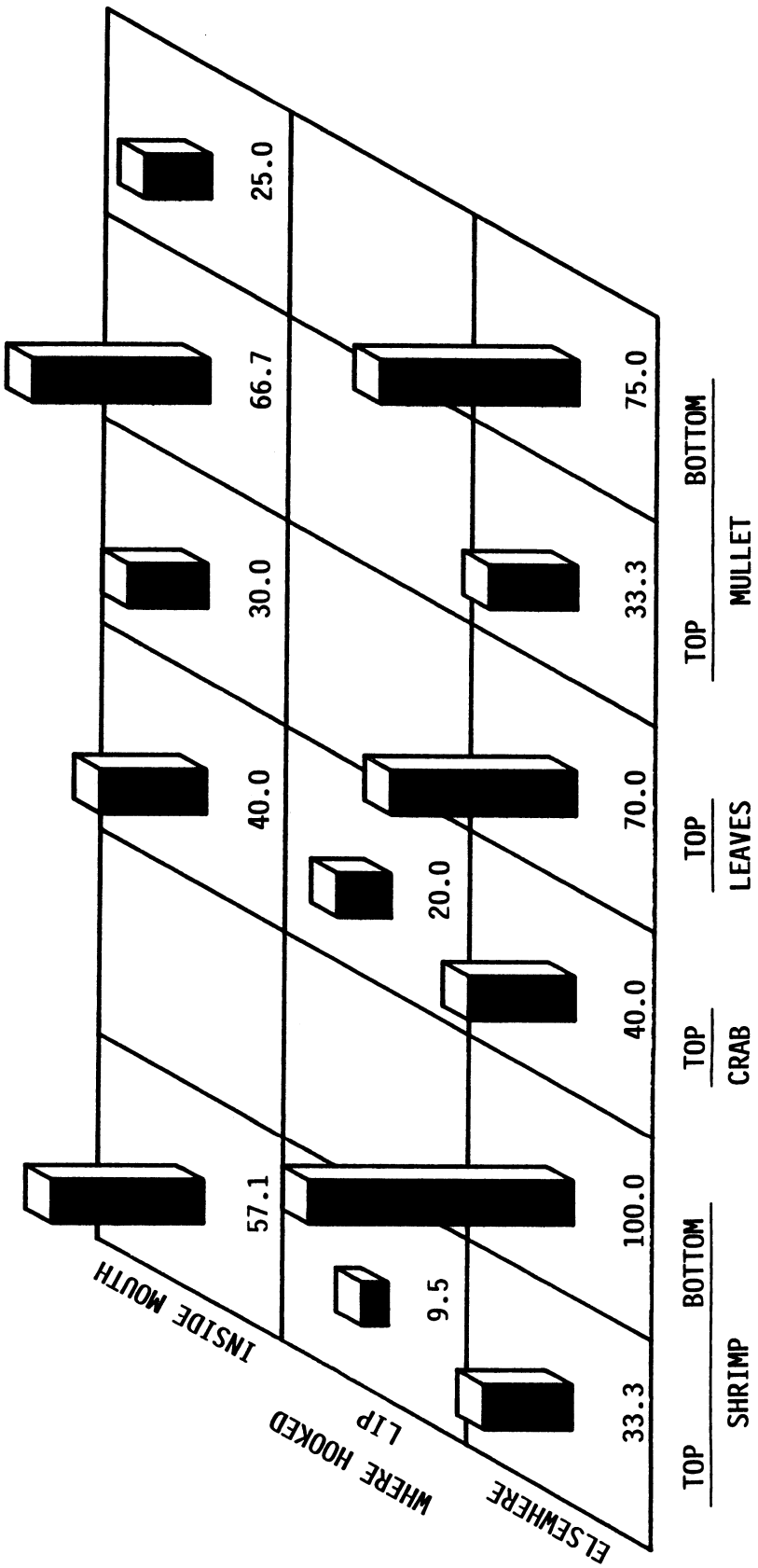

INSIDE MOUTH
WHERE HOOKED LIP
ELSEWHERE
57.1
9.5
33.3
100.0
40.0
20.0
70.0
40.0
66.7
30.0
25.0
75.0
33.3
TOP
BOTTOM
SHRIMP
CRAB
LEAVES
MULLET

Figure 4. Block chart (with %) of place hooked (lip, mouth, elsewhere) by position (top vs bottom) and bait (shrimp, crab, leaves, salted mullet) for red drum.

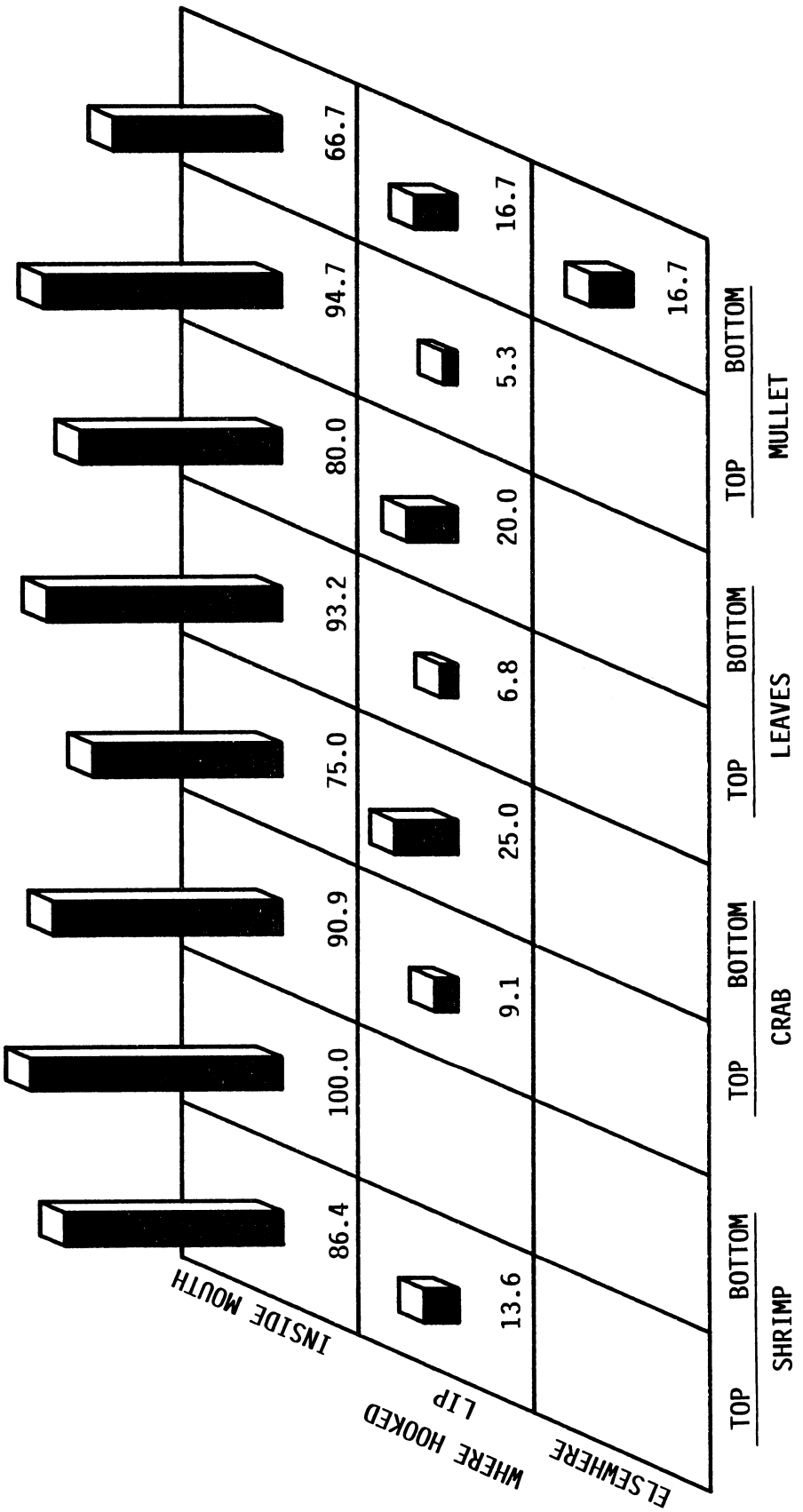
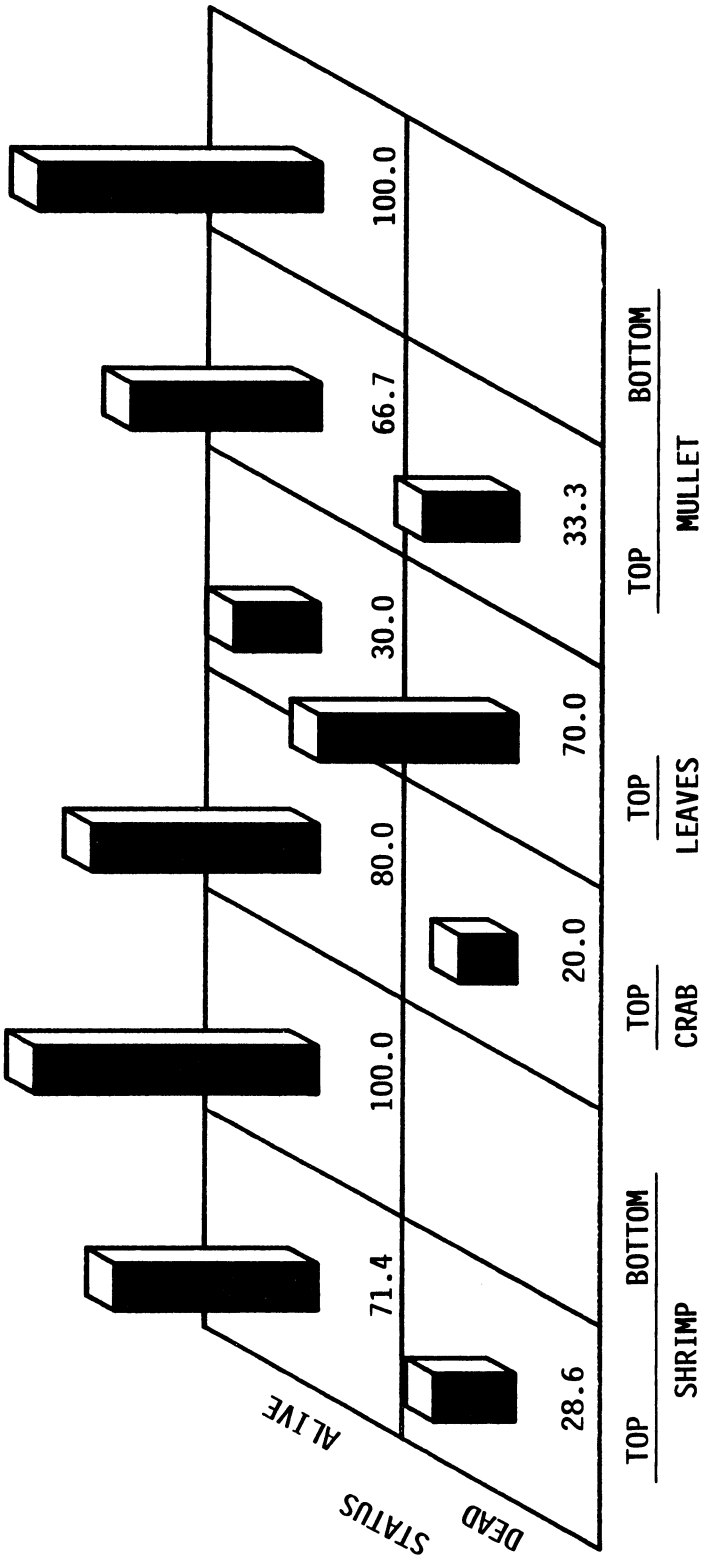

INSIDE MOUTH
WHERE HOOKED
LIP
ELSEWHERE
TOP
BOTTOM
SHRIMP
86.4
13.6
TOP
BOTTOM
CRAB
100.0
9.1
TOP
BOTTOM
LEAVES
90.9
25.0
TOP
BOTTOM
MULLET
75.0
6.8
93.2
20.0
80.0
5.3
94.7
16.7
66.7
16.7

Figure 5. Block chart (with %) of spotted seatrout found alive and dead by position (top, bottom) and bait (shrimp, crab, leaves, salted mullet).


STATUS
ALIVE
DEAD
TOP
BOTTOM
SHRIMP
71.4
28.6
100.0
TOP
CRAB
100.0
20.0
80.0
TOP
LEAVES
80.0
70.0
30.0
TOP
BOTTOM
MULLET
66.7
33.3
100.0

Appendix A. Number of select finfish species caught on top and bottom trotlines baited with four bait types in the upper and lower Laguna Madre during June-August 1985.

Table A.1. Number of select finfish species caught on top and bottom trotlines baited with four bait types in the upper and lower Laguna Madre during June-August 1985.

Area / Date / Bait	Top					Bottom				
	Red drum	Black drum	Spotted seatrout	Hardhead	"Others"	Red drum	Black drum	Spotted seatrout	Hardhead	"Others"
Upper Laguna Madre										
06-06-85										
Crab	1	0	0	13	1	0	0	0	7	0
Shrimp	0	0	0	11	1	0	0	0	7	1
Leaves	0	0	1	2	1	0	0	0	0	0
Salted Mullet	1	0	0	12	0	0	0	0	6	0
06-20-85										
Crab	3	0	0	20	0	0	0	0	4	0
Shrimp	3	0	0	5	0	0	0	0	2	0
Leaves	8	0	0	0	0	0	0	0	0	0
Salted Mullet	2	0	0	19	0	0	0	0	12	0
06-21-85										
Crab	1	0	0	37	0	0	0	0	11	1
Shrimp	2	0	1	5	0	0	0	0	0	1
Leaves	7	0	0	0	0	0	0	0	0	0
Salted Mullet	2	0	0	11	1	0	0	0	18	0
07-02-85										
Crab	0	0	0	4	0	0	0	0	1	0
Shrimp	1	0	0	1	0	0	0	0	3	0
Leaves	0	0	0	0	0	0	0	0	0	0
Salted Mullet	0	0	0	5	1	0	0	0	9	0
07-17-85										
Crab	0	0	0	22	0	0	0	0	1	1
Shrimp	0	0	0	0	0	0	0	0	0	0
Leaves	1	0	0	0	0	0	0	0	0	0
Salted mullet	0	0	0	6	0	0	0	0	12	0

Table A.1. (Cont'd.).

Area / Date / Bait	Top: Red drum	Top: Black drum	Top: Spotted seatrout	Top: Hardhead	Top: "Others"	Bottom: Red drum	Bottom: Black drum	Bottom: Spotted seatrout	Bottom: Hardhead	Bottom: "Others"
Upper Laguna Madre (Cont'd.).										
07-23-85										
Crab	0	0	0	10	1	0	0	0	1	0
Shrimp	0	0	0	2	1	0	0	0	0	0
Leaves	0	0	0	8	1	0	0	0	0	0
Salted mullet	0	0	0	8	1	0	0	0	12	0
08-08-85										
Crab	0	0	0	11	0	0	0	0	2	1
Shrimp	0	0	0	4	1	0	0	0	2	0
Leaves	12	0	0	3	0	1	0	0	0	0
Salted mullet	0	0	0	6	1	1	0	0	14	0
08-21-85										
Crab	0	0	0	17	1	0	0	0	7	2
Shrimp	0	0	0	3	0	0	0	0	3	0
Leaves	0	0	0	0	0	0	0	0	0	0
Salted mullet	0	0	0	5	0	0	0	0	3	0
08-22-85										
Crab	1	0	0	13	0	0	0	0	9	0
Shrimp	0	0	0	2	0	0	0	0	4	0
Leaves	0	0	0	0	0	0	0	0	0	0
Salted mullet	0	0	0	6	0	0	0	0	17	0
Lower Laguna Madre										
06-06-85										
Crab	7	2	0	7	0	1	3	0	11	0
Shrimp	1	0	0	1	0	1	1	0	0	0
Leaves	4	1	0	0	0	0	0	0	0	0
Salted mullet	2	0	0	3	0	1	0	0	7	0

Table A.1. (Cont'd.).

Area / Date / Bait	Top: Red drum	Top: Black drum	Top: Spotted seatrout	Top: Hardhead	Top: "Others"	Bottom: Red drum	Bottom: Black drum	Bottom: Spotted seatrout	Bottom: Hardhead	Bottom: "Others"
Lower Laguna Madre (Cont'd.).										
06-11-85										
Crab	0	0	0	18	0	1	0	0	14	0
Shrimp	0	0	0	1	2	0	0	0	0	2
Leaves	0	0	5	1	6	2	0	0	0	0
Salted mullet	2	0	0	7	2	0	0	2	4	1
06-21-85										
Crab	7	0	2	24	0	3	0	0	4	0
Shrimp	1	0	0	0	1	0	0	0	0	0
Leaves	4	0	0	0	0	0	1	0	0	0
Salted mullet	0	0	0	3	0	0	0	1	2	0
07-10-85										
Crab	10	3	0	47	2	0	0	0	34	0
Shrimp	3	0	0	7	0	0	0	1	0	0
Leaves	2	0	0	1	0	0	0	0	0	0
Salted mullet	0	0	0	5	0	0	0	0	5	0
07-11-85										
Crab	5	1	0	35	0	1	1	0	13	0
Shrimp	3	1	0	3	1	0	0	0	0	0
Leaves	3	0	0	3	0	0	0	0	1	0
Salted mullet	1	1	0	1	1	1	0	0	4	0
07-23-85										
Crab	1	0	1	2	1	2	0	0	0	0
Shrimp	0	0	0	2	0	0	0	0	1	0
Leaves	2	0	0	0	2	0	0	0	0	0
Salted mullet	0	0	0	3	0	0	0	0	3	0

Table A.1. (Cont'd.).

Area / Date / Bait	Top: Red drum	Top: Black drum	Top: Spotted seatrout	Top: Hardhead	Top: "Others"	Bottom: Red drum	Bottom: Black drum	Bottom: Spotted seatrout	Bottom: Hardhead	Bottom: "Others"
Lower Laguna Madre (Cont'd.).										
08-02-85										
Crab	2	0	0	6	1	2	0	0	3	0
Shrimp	0	0	10	26	3	0	0	0	0	0
Leaves	0	0	0	0	0	0	0	0	0	0
Salted mullet	0	0	0	0	0	1	0	1	9	1
08-07-85										
Crab	5	1	1	8	1	0	0	0	4	0
Shrimp	5	0	3	7	0	1	0	0	0	0
Leaves	16	1	1	8	0	1	0	0	0	0
Salted mullet	6	0	0	9	0	1	0	0	11	0
08-21-85										
Crab	2	0	1	12	0	2	1	0	0	0
Shrimp	3	0	7	15	0	1	0	0	2	0
Leaves	1	1	3	0	2	0	0	0	0	0
Salted mullet	3	0	2	20	1	1	0	0	25	0
Bay System Combined										
Crab	45	7	5	306	8	12	5	0	126	5
Shrimp	22	1	21	95	10	3	1	1	24	4
Leaves	60	3	10	26	12	4	1	0	1	0
Salted mullet	19	1	2	129	8	6	0	4	173	2
Grand Total	146	12	38	556	38	25	7	5	324	11

Appendix B. Hours set, baits left and hydrological and meteorological data recorded during Texas Parks and Wildlife Department trotline sets in the upper and lower Laguna Madre during June-August 1985.

Table B.1. Hours set, baits left and hydrological and meteorological data recorded during Texas Parks and Wildlife Department trotline sets in the upper and lower Laguna Madre during June-August 1985.

Area / Date	Location: Latitude	Location: Longitude	Bait	Top: Hours (No.)	Top: Baits left (No.)	Top: Depth range (m)	Top: Temperature (C)	Top: Salinity (o/oo)	Bottom: Hours (No.)	Bottom: Baits left (No.)	Bottom: Depth range (m)	Bottom: Temperature (C)	Bottom: Salinity (o/oo)
Upper Laguna Madre													
06-06-85	27-18-30	97-37-30	Crab	16.5	91	0.9-1.1	27.0	32.2	15.6	91	0.7-1.1	27.0	32.2
			Shrimp	16.8	0	0.7-1.2	28.0	32.2	17.0	0	0.6-1.3	28.0	32.2
			Leaves	18.5	78	0.6-1.1	28.0	32.2	17.7	69	0.7-1.1	27.0	32.2
			Salted Mullet	14.2	8	0.8-1.2	27.0	32.2	17.1	33	0.7-1.2	28.01	32.2
06-20-85	27-34-30	97-17-30	Crab	15.8	77	1.0-1.1	25.0	33.3	16.2	52	1.2-1.2	25.0	33.3
			Shrimp	16.3	0	1.0-1.0	25.0	33.3	16.0	0	1.0-1.0	25.0	33.3
			Leaves	16.7	66	1.0-1.1	25.0	33.3	16.7	99	1.0-1.0	25.0	33.3
			Salted mullet	16.1	2	1.2-1.2	25.0	33.3	15.8	6	1.3-1.3	25.0	33.3
06-21-85	27-33-30	97-18-30	Crab	16.9	93	1.1-1.2	26.0	32.8	15.0	86	1.1-1.1	25.5	31.6
			Shrimp	16.1	0	1.1-1.1	26.5	33.9	16.8	2	1.1-1.1	27.0	32.8
			Leaves	15.3	97	1.1-1.1	26.0	32.8	16.3	100	1.1-1.2	26.0	32.8
			Salted Mullet	16.0	4	1.1-1.1	25.5	31.6	17.0	6	1.1-1.1	25.5	31.6
07-02-85	27-35-85	97-16-30	Crab	16.1	89	0.7-0.7	28.0	37.8	15.9	73	0.7-0.7	28.0	38.3
			Shrimp	16.4	0	0.7-0.7	28.0	40.0	16.3	1	0.7-0.7	28.0	38.3
			Leaves	17.0	99	0.7-0.7	28.0	40.0	16.7	100	0.8-0.8	28.0	38.3
			Salted mullet	15.4	1	0.7-0.7	28.0	38.3	15.6	97	0.8-0.8	28.0	38.3
07-17-85	27-34-30	97-17-30	Crab	15.5	71	0.7-0.7	27.0	35.5	15.9	74	0.8-0.8	28.0	35.5
			Shrimp	16.5	0	0.7-0.7	28.5	35.5	16.2	0	0.7-0.7	28.5	35.5
			Leaves	17.0	99	0.8-0.8	29.0	35.5	17.3	100	0.9-0.9	29.5	35.5
			Salted mullet	15.5	0	0.8-0.8	27.0	35.5	15.4	0	0.8-0.8	27.0	35.5
07-23-85	27-30-30	97-19-30	Crab	16.5	43	1.5-1.5	28.5	38.3	17.0	82	1.5-1.5	29.0	38.3
			Shrimp	17.5	0	1.6-1.7	29.0	38.3	17.6	0	1.5-1.6	29.0	38.3
			Leaves	17.3	82	1.5-1.7	29.0	38.3	17.7	92	1.8-1.8	29.0	38.3
			Salted mullet	16.0	1	1.3-1.4	28.0	38.3	16.2	0	1.5-1.6	28.0	38.3

Table B.1. (Cont.d.).

Area / Date	Location: Latitude	Location: Longitude	Bait	Top: Hours (No.)	Top: Baits left (No.)	Top: Depth range (m)	Top: Temperature (C)	Top: Salinity (o/oo)	Bottom: Hours (No.)	Bottom: Baits left (No.)	Bottom: Depth range (m)	Bottom: Temperature (C)	Bottom: Salinity (o/oo)
Upper Laguna Madre (Cont'd.).													
08-08-85	27-32-30	97-16-30	Crab	15.8	78	1.5-1.6	28.0	39.4	15.6	93	1.3-1.6	28.0	39.4
			Shrimp	15.6	0	1.5-1.6	29.0	39.4	15.6	0	1.4-1.6	29.0	39.4
			Leaves	15.4	20	1.5-1.6	28.0	39.4	14.7	96	1.2-1.5	28.0	39.4
			Salted mullet	15.5	1	1.5-1.6	28.0	39.4	15.6	1	1.3-1.5	28.0	39.4
08-21-85	27-34-30	97-17-30	Crab	15.9	90	1.0-1.0	29.5	40.5	15.9	79	0.9-1.0	29.0	42.7
			Shrimp	16.9	0	1.0-1.0	30.0	40.5	16.4	0	1.0-1.0	30.0	40.5
			Leaves	17.2	100	1.1-1.1	30.0	40.5	17.1	99	1.0-1.0	30.0	42.7
			Salted mullet	15.8	4	0.9-1.0	29.0	40.5	15.7	7	0.9-0.9	28.0	40.5
08-22-85	27-30-30	97-19-30	Crab	16.6	80	1.1-1.2	29.5	41.6	15.6	90	1.0-1.1	29.0	41.6
			Shrimp	16.3	0	1.0-1.1	30.0	41.6	16.5	0	1.0-1.2	30.0	41.6
			Leaves	16.2	99	1.1-1.2	30.0	41.6	16.5	100	1.1-1.2	30.0	41.6
			Salted mullet	15.6	6	1.0-1.0	29.0	41.6	15.8	4	1.0-1.2	29.0	41.6
Lower Laguna Madre													
06-06-85	26-01-30	97-11-30	Crab	15.5	84	0.8-0.8	28.0	37.0	16.4	92	0.7-0.8	28.0	37.0
			Shrimp	14.8	0	0.7-0.8	28.0	37.0	13.8	0	0.5-0.7	28.0	36.0
			Leaves	17.1	91	0.7-0.8	27.5	28.0	16.4	97	0.8-0.8	27.5	38.0
			Salted mullet	15.4	3	0.6-0.8	28.0	38.0	14.2	5	0.3-0.6	28.0	38.0
06-11-85	26-23-30	97-19-30	Crab	16.1	78	0.7-0.8	28.0	37.0	17.0	93	0.8-0.8	28.0	37.0
			Shrimp	14.2	0	0.7-0.7	28.0	38.0	13.5	0	0.6-0.7	28.0	38.0
			Leaves	17.7	91	0.8-0.8	28.5	38.0	18.5	94	0.6-0.7	28.5	38.0
			Salted mullet	14.8	4	0.5-0.5	28.0	39.0	15.4	2	0.6-0.7	28.0	39.0

Table B.1. (Cont'd.).

Area / Date	Location: Latitude	Location: Longitude	Bait	Top: Hours (No.)	Top: Baits left (No.)	Top: Depth range (m)	Top: Temperature (C)	Top: Salinity (o/oo)	Bottom: Hours (No.)	Bottom: Baits left (No.)	Bottom: Depth range (m)	Bottom: Temperature (C)	Bottom: Salinity (o/oo)
Lower Laguna Madre (Cont'd.).													
06-21-85	26-20-30	97-18-30	Crab	13.7	65	0.6-0.7	27.0	36.0	16.2	71	0.7-0.7	27.0	36.0
			Shrimp	14.7	0	0.6-0.6	27.0	36.0	15.3	0	0.5-0.6	27.0	36.0
			Leaves	17.2	87	0.7-0.7	27.0	36.0	18.2	94	0.5-0.6	27.0	36.0
			Salted mullet	16.0	1	0.5-0.5	27.0	37.0	16.7	2	0.5-0.5	17.0	37.0
07-10-85	26-01-30	97-10-45	Crab	14.2	57	0.6-0.7	27.5	34.0	18.2	78	0.4-0.5	27.0	30.0
			Shrimp	16.3	0	0.6-0.7	28.0	34.0	18.2	0	0.4-0.5	27.0	30.0
			Leaves	14.2	86	0.6-0.8	27.5	34.0	18.0	99	0.4-0.5	27.0	30.0
			Salted mullet	14.5	0	0.6-0.7	27.5	34.0	19.5	1	0.5-0.5	27.0	30.0
07-11-85	26-01-30	96-10-45	Crab	17.6	55	0.6-0.8	28.0	34.0	17.1	76	0.4-0.6	26.0	32.0
			Shrimp	17.5	0	0.6-0.6	28.0	34.0	16.8	0	0.5-0.5	26.0	32.0
			Leaves	17.4	83	0.7-0.7	27.0	34.0	16.8	90	0.5-0.6	26.0	32.0
			Salted mullet	17.2	0	0.6-0.7	27.0	34.0	16.5	2	0.5-0.5	26.0	32.0
07-23-85	26-09-30	97-14-30	Crab	18.8	68	0.5-0.7	28.5	37.0	19.2	60	0.4-0.4	28.5	38.0
			Shrimp	19.5	0	0.8-1.1	30.0	38.0	19.2	0	0.6-1.1	30.0	38.0
			Leaves	18.9	87	0.5-0.7	28.5	37.0	19.1	94	0.5-0.5	28.5	37.0
			Salted mullet	19.2	0	0.7-0.7	28.5	38.0	19.5	0	0.4-0.4	28.0	37.0
08-02-85	26-09-30	97-16-30	Crab	19.6	34	0.4-0.6	28.0	38.0	15.8	69	0.7-0.8	28.0	38.0
			Shrimp	19.1	0	1.2-1.3	28.0	38.0	15.8	0	0.6-0.8	28.0	38.0
			Leaves	18.7	95	0.5-0.5	28.0	38.0	15.8	80	0.6-0.7	28.0	38.0
			Salted mullet	18.9	1	0.5-1.2	28.0	38.0	17.6	3	0.7-0.8	28.0	38.0

Table B.1. (Cont'd.).

Area / Date	Location: Latitude	Location: Longitude	Bait	Top: Hours (No.)	Top: Baits left (No.)	Top: Depth range (m)	Top: Temperature (C)	Top: Salinity (o/oo)	Bottom: Hours (No.)	Bottom: Baits left (No.)	Bottom: Depth range (m)	Bottom: Temperature (C)	Bottom: Salinity (o/oo)
Lower Laguna Madre (Cont'd.).													
08-07-85	26-14-30	97-13-30	Crab	16.8	64	0.7-0.8	27.5	40.0	17.9	77	0.8-0.8	28.5	40.0
			Shrimp	14.7	0	0.6-0.6	27.5	40.0	16.0	0	0.7-0.7	27.5	40.0
			Leaves	15.2	60	0.8-0.8	28.5	40.0	16.2	97	0.8-0.8	28.5	40.0
			Salted mullet	16.9	0	0.8-0.8	29.5	40.0	18.0	2	0.8-0.8	29.5	40.0
08-21-85	26-23-30	97-19-30	Crab	17.3	69	0.6-0.8	29.5	40.0	17.4	43	0.6-0.6	29.5	39.0
			Shrimp	15.7	0	0.6-0.8	29.5	40.0	17.1	0	0.8-0.8	30.5	40.0
			Leaves	18.1	65	0.7-0.7	29.5	39.0	17.4	93	0.7-0.8	29.5	39.0
			Salted Mullet	17.9	19	0.8-0.8	30.5	40.0	19.0	0	0.6-0.8	30.5	40.0

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