Paul Hammerschmidt

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Management Data Series Number 47
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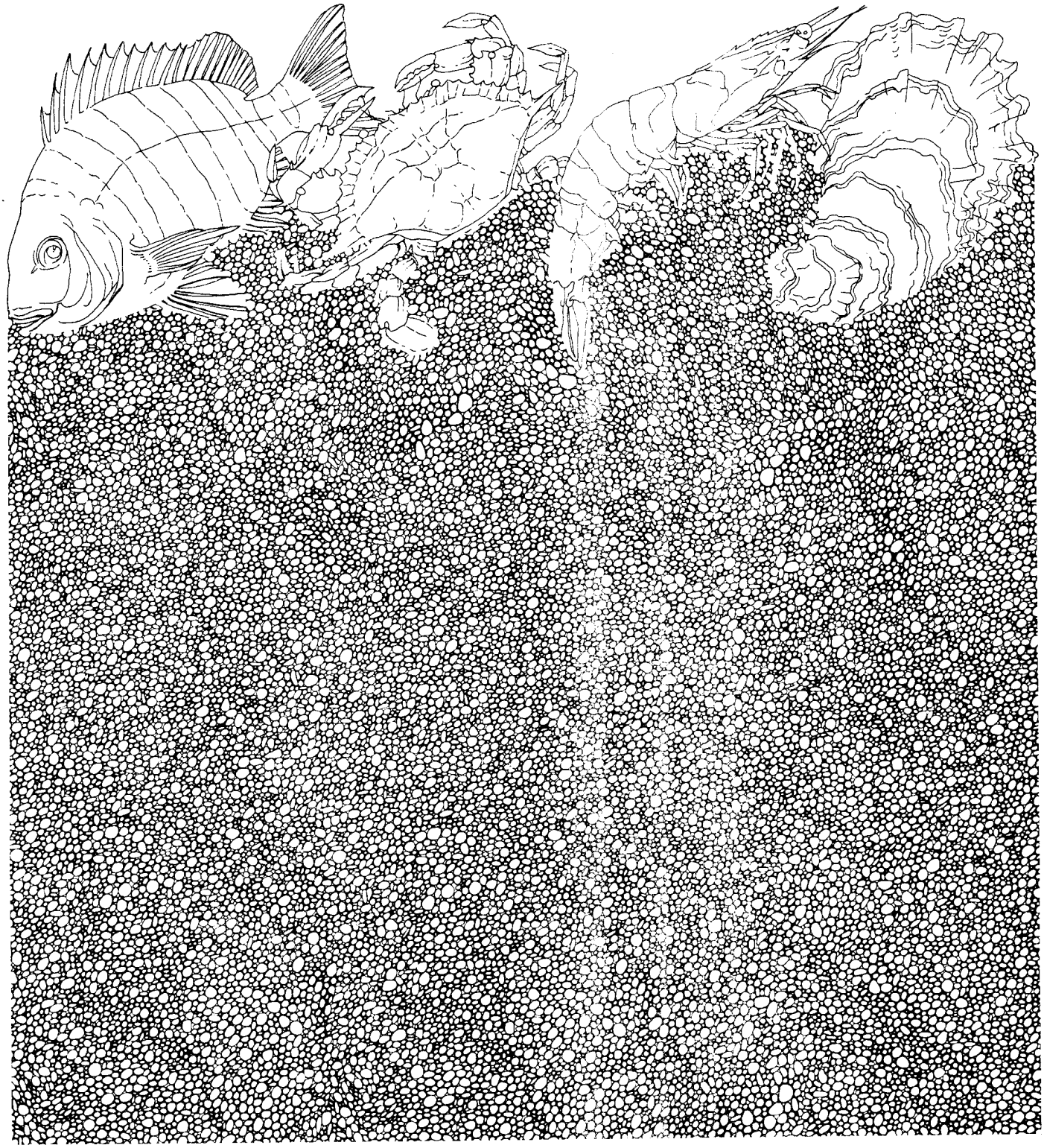

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4200 Smith School Road
Austin, Texas 78744

ACKNOWLEDGEMENTS

I wish to thank all of the members of the Bay Finfish Monitoring Program for their assistance in constructing and fishing the gill nets. Additional assistance was provided by Kyle Spiller and Larry McEachron. Thanks are also extended to Bill Mercer for drafting the figures, Tom Heffernan, Roy Johnson, Gary Matlock, Gary Saul and Al Green for reviewing the manuscript and Pam Dalton for typing it.

## ABSTRACT

Commercial fishermen contend that large mesh gill nets can be used to catch black drum (Pogonias cromis), sheepshead (Archosargus probatocephalus) and southern flounder (Paralichthys lethostigma) without catching red drum (Sciaenops ocellatus) and spotted seatrout (Cynoscion nebulosus). The Texas Parks and Wildlife Department examined this contention in the Corpus Christi Bay and Laguna Madre systems during September-December 1981 with gill nets of 15.2-17.8 cm (6-7 inch) stretch mesh constructed of either monofilament or multifilament webbing.

A total of 1440 fish representing 31 different species were collected. The five economically important fishes--red drum, black drum, spotted seatrout, southern flounder and sheepshead--comprised 60.5% of the total number of organisms caught. In all meshes and webbing types combined black drum, sheepshead and southern flounder made up ∿91% of the catch and red drum and spotted seatrout comprised the remaining ∿9%.

While each of the target species was caught over a wide size range mean total lengths for only black drum, sheepshead and southern flounder exhibited definite increases with increased mesh size.

Species selectivity occurred for different webbing types. Black drum were caught in nearly equal numbers in multifilament and monofilament; more red drum and spotted seatrout were caught in monofilament, while more sheepshead and southern flounder were caught in multifilament webbing.

The results of this study, in addition to previous studies, indicate that gill nets cannot be used in Texas bays to select for some species of fish and simultaneously exclude red drum and spotted seatrout.

## INTRODUCTION

Decreases in red drum (Sciaenops ocellatus) and spotted seatrout (Cynoscion nebulosus) availability and harvest in Texas bays (Hegen 1981, McEachron and Green 1982) prompted the 67th Texas Legislature to prohibit the sale of both species in September 1981 (Matlock 1983). These two species have historically comprised almost 50% of the commercial finfish harvest from Texas bays (Hamilton 1982), so this legislation would undoubtedly shift the emphasis of bay finfish fishermen to other species or activities. The impact would probably be greatest in the Laguna Madre where finfish were the major commercial food species landed (Hamilton 1982).

Prior to the effective date of the legislation commercial fishermen contended that large mesh ($\geq$ 15.2 cm stretched) monofilament and multifilament gill nets could be used effectively on the Texas coast to catch species other than red drum and spotted seatrout. Extensive sampling in Texas bays, including the Laguna Madre, with monofilament gill nets had been conducted (Matlock et al. 1978), but meshes larger than 15.2-cm (stretched) had not been used. This study was conducted in the Laguna Madre and Corpus Christi Bay to determine if large mesh monofilament or multifilament gill nets could be used to catch selected economically important finfishes (primarily black drum (Pogonias cromis), sheepshead (Archosargus probatocephalus) and southern flounder (Paralichthys lethostigma)) without catching red drum and spotted seatrout.

## MATERIALS AND METHODS

Gill nets were 183 m long and 1.6 m deep with two separate 91.5-m sections of multifilament (#277, Nylon Net Co.) and monofilament (#16) webbing. Each 183-m net was a different stretched mesh size: 15.2, 16.5 and 17.8-cm. Webbing in each section was hung to both the float and lead lines on a one-half basis.

Samples were collected in the Corpus Christi Bay and upper and lower Laguna Madre systems during September-December 1981 (Figures 1-3). Gill nets were set in offshore areas where black drum, sheepshead and flounder were expected to be caught based on commercial fishermen input. Nets were set within two hours before sunset and were retrieved within two hours after sunrise. Total hours fished (to the nearest 0.1 h) were calculated for each net set.

Fish were identified to species (Parker 1972) and enumerated. Total lengths (to the nearest mm) were obtained for the first 19 individuals of each species from each mesh size and webbing type.

Hydrological and meteorological parameters were measured at the time of the set and retrieval of each gill net sample (Appendix A, Tables 1 and 2).

## RESULTS

Thirty-six gill net samples (12 sets for each mesh size) were collected in Corpus Christi Bay and the upper and lower Laguna Madre systems from September-December 1981 (Table 1). Total fishing time for each 183-m net (each a different mesh size) ranged from 185.1 to 186.7 hours.

A total of 1440 fish representing 31 different species were collected during the sampling period (Table 2). The five economically important bay fishes--red drum, black drum, spotted seatrout, southern flounder and sheepshead--comprised 60.6% of the total number of fish caught. Within this group, black drum, sheepshead, and southern flounder comprised 90.7% of the individuals caught; red drum and spotted seatrout comprised the remaining 9.3%. Nine species were represented by only one individual.

Black drum was the most abundant species collected, comprising 35.2% of the total number of fish caught (Table 3). Sheepshead was the second most abundant species collected (15.8%). Black drum, sheepshead, and southern flounder combined comprised 54.9% of all individuals caught; red drum and spotted seatrout combined comprised 5.6% of all individuals caught.

Approximately 46% of the red drum and spotted seatrout colelcted during the study were caught during one set (3 nets) in the lower Laguna Madre (9 September 1981). Within this set, these two species comprised 20.2% of all the individuals caught, and 56.1% by number of the economically important species.

There was considerable variation in the mean size ranges of red drum and spotted seatrout among mesh sizes and webbing types (Table 4). The largest mean size of red drum (683 mm total length) and spotted seatrout (685 mm) occurred in the smallest mesh sizes. Total lengths for red drum and spotted seatrout measured in this study ranged from 360-755 mm and 310-725 mm, respectively. Mean sizes of black drum, sheepshead and southern flounder generally increased with larger mesh size. Black drum were caught over a wide size range (405-975 mm) regardless of mesh size or webbing type although 71.6% of the total number measured were between 445 and 545 mm (Figure 4). Total lengths for sheepshead measured in this study ranged from 240-510 mm (Figure 5). The mean total lengths of southern flounder by mesh and webbing type is not indicative of the wide size range (280-790 mm) of flounder caught during this study (Table 4).

Black drum were caught as well with monofilament as with multifilament webbing (Table 5). For all mesh sizes combined, 48.3% of all the black drum collected were caught in monofilament; 51.7% were caught in multifilament. Percent of capture for sheepshead and southern flounder in multifilament over mesh sizes was 67.5% and 75.4%, respectively. Red drum and spotted seatrout had a higher percent of capture in monofilament webbing for all mesh sizes combined, however there was no trend in percent of catch between webbing types or across mesh sizes.

## DISCUSSION

The results of this study, in addition to previous studies, indicate that gill nets cannot be used in Texas bays to select for some species of fish and simultaneously exclude red drum and spotted seatrout.

Both mesh size and webbing type affect the type of species caught as well as the number of size of the individuals (Hamley 1975). As mesh sizes increase, fewer fish are caught but their size generally increases (Matlock et al. 1978, Adkins and Bourgeois 1982). Additionally, monofilament webbing is generally more effective than multifilament (Larkins 1963, Washington 1972, Pristas and Trent 1977, Adkins and Bourgeois 1982). However, this general pattern varies among species. Pristas and Trent (1978) found catches in monofilament webbing greater than those in multifilament webbing for five of twelve saltwater species. For the remaining seven species, significant differences in catches between webbing types were not consistently found. Adkins and Bourgeios (1982) found monofilament generally more efficient than multifilament webbing for most species, including spotted seatrout and sheepshead, although they found multifilament webbing more effective in catching black drum, southern flounder and red drum. The discrepancy in webbing selectivity for sheepshead and red drum between Adkins and Bourgeois (1982) and this study may be an artifact of the small total catch of sheepshead (60) and red drum (13) found in the former study. Additionally, Adkins and Bourgeois (1982) sampled actively "struck" nets during day whereas this study sampled passively fished nets during night.

If House Bill 1000 is effective in reducing overfishing of red drum and spotted seatrout, then there should be more of these large fish in the bays. It follows that the use of large mesh gill nets would reduce their numbers, thereby overriding the intent of H.B. 1000.

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Table 1. Total hours of overnight fishing with each mesh size gill net[a] at locations sampled on the lower Texas coast, September-December 1981.

| Bay system | Date | Location | Mesh size (cm) 15.2 | 16.5 | 17.8 |
|---|---|---|---|---|---|
| Lower Laguna Madre | 9-02-81 | 1 mi N Marker 23 | 14.2 | 17.2 | 19.3 |
| Lower Laguna Madre | 9-09-81 | E Marker 27 | 16.7 | 15.4 | 13.9 |
| Upper Laguna Madre | 9-30-81 | W Marker 119 | 14.5 | 14.5 | 14.5 |
| Upper Laguna Madre | 10-15-81 | E Marker 91 | 14.0 | 14.0 | 14.0 |
| Upper Laguna Madre | 10-27-81 | Kleberg Point-Baffin | 15.2 | 16.9 | 17.2 |
| Upper Laguna Madre | 10-28-81 | Alazan-3 Sloughs | 18.0 | 16.5 | 15.0 |
| Corpus Christi Bay | 11-02-81 | NE Nueces Bay | 15.1 | 16.0 | 17.0 |
| Lower Laguna Madre | 11-16-81 | Port Mansfield "Y" | 16.5 | 15.8 | 15.0 |
| Lower Laguna Madre | 11-17-81 | N Port Isabel | 15.3 | 14.8 | 14.0 |
| Corpus Christi Bay | 12-02-81 | Shamrock Cove | 14.8 | 14.6 | 14.4 |
| Upper Laguna Madre | 12-16-81 | SW Rivera Beach | 15.2 | 15.2 | 15.2 |
| Upper Laguna Madre | 12-21-81 | Alazan-3 Sloughs | 15.6 | 15.8 | 16.5 |
| | | Total | 185.1 | 186.7 | 186.0 |

[a]Each gill net was 183 m long (91.5 m monofilament webbing; 91.5 m multifilament webbing).

Table 2. Number of each species caught in each mesh size and webbing type of overnight gill net sets in Corpus Christi Bay and the Laguna Madre, September-December 1981.

| Species | Common name | 15.2 cm | | | 16.5 cm | | | 17.8 cm | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Mono-filament | Multi-filament | Combined | Mono-filament | Multi-filament | Combined | Mono-filament | Multi-filament | Combined |
| Aetobatus narinari | Spotted eagle ray | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| Ancylopsetta quadrocellata | Ocellated flounder | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| Archosargus probatocephalus | Sheepshead | 30 | 49 | 79 | 31 | 68 | 99 | 13 | 36 | 49 |
| Arius felis | Hardhead catfish | 16 | 9 | 25 | 22 | 17 | 39 | 16 | 12 | 28 |
| Bagre marinus | Gafftopsail catfish | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bairdiella chrysoura | Silver perch | 0 | 4 | 4 | 2 | 2 | 4 | 0 | 1 | 1 |
| Brevoortia gunteri | Finescale menhaden | 1 | 1 | 2 | 0 | 0 | 0 | 0 | 1 | 1 |
| B. patronus | Gulf menhaden | 13 | 40 | 53 | 9 | 33 | 42 | 19 | 30 | 49 |
| Carcharhinus leucas | Bull shark | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 1 |
| C. limbatus | Blacktip shark | 3 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| Chaetodipterus faber | Atlantic spadefish | 0 | 2 | 2 | 0 | 1 | 1 | 1 | 0 | 1 |
| Cynoscion arenarius | Sand seatrout | 4 | 4 | 8 | 3 | 5 | 8 | 1 | 6 | 7 |
| C. nebulosus | Spotted seatrout | 4 | 6 | 10 | 10 | 4 | 14 | 9 | 7 | 16 |
| Dasyatis americana | Southern stingray | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 1 | 1 |
| D. sabina | Altantic stingray | 1 | 17 | 18 | 7 | 33 | 40 | 5 | 25 | 30 |
| Dorosoma cepedianum | Gizzard shad | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Elops saurus | Ladyfish | 3 | 0 | 3 | 15 | 1 | 16 | 9 | 0 | 9 |
| Leiostomus xanthrus | Spot | 0 | 4 | 4 | 0 | 1 | 1 | 0 | 0 | 0 |
| Micropogonias undulatus | Atlantic croaker | 1 | 7 | 8 | 1 | 4 | 5 | 0 | 2 | 2 |
| Mugil cephalus | Striped mullet | 2 | 0 | 2 | 0 | 1 | 1 | 0 | 0 | 0 |
| Orthopristis chrysoptera | Pigfish | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 |
| Paralichthys lethostigma | Southern flounder | 1 | 14 | 15 | 5 | 15 | 20 | 8 | 14 | 22 |
| Pogonias cromis | Black drum | 124 | 117 | 241 | 91 | 88 | 179 | 30 | 57 | 87 |
| Pomatomus saltatrix | Bluefish | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Rhinoptera bonasus | Cownose ray | 1 | 3 | 4 | 12 | 5 | 17 | 30 | 21 | 51 |
| Rhizoprionodon terraenovae | Atlantic sharpnose shark | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| Sciaenops ocellatus | Red drum | 9 | 5 | 14 | 7 | 7 | 14 | 10 | 3 | 13 |
| Selene vomer | Lookdown | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sphyrna lewini | Scalloped hammerhead | 6 | 3 | 9 | 5 | 2 | 7 | 4 | 2 | 6 |
| S. tiburo | Bonnethead | 21 | 16 | 37 | 0 | 2 | 2 | 0 | 4 | 4 |
| Trachinotus carolinus | Florida pompano | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 |
| All species | | 242 | 305 | 547 | 221 | 291 | 512 | 156 | 225 | 381 |

Table 3. Percent of total catch and number (in parentheses) by mesh size (webbing types combined) of five economically important finfish.

| Species | Mesh size (cm) | | | All meshes combined |
|---|---|---|---|---|
| | 15.2 | 16.5 | 17.8 | |
| Black drum | 44.1 (241) | 35.0 (179) | 22.8 (87) | 35.2(507) |
| Sheepshead | 14.4 (79) | 19.3 (99) | 12.9 (49) | 15.8(227) |
| Southern flounder | 2.7 (15) | 3.9 (20) | 5.8 (23) | 4.0(57) |
| Spotted seatrout | 1.8 (10) | 2.7 (14) | 4.2 (16) | 2.8(40) |
| Red Drum | 2.6 (14) | 2.7 (14) | 3.4 (13) | 2.8(41) |
| All other species | 34.4 (188) | 36.3 (186) | 50.9 (194) | 39.4(568) |

Table 4. Mean total lengths ± 1 SE (mm) of selected species caught with gill nets of different webbing type and stretched mesh (number in parentheses = number measured).

| Species | 15.2 cm | | 16.5 cm | | 17.8 cm | |
|---|---|---|---|---|---|---|
| | Mono-filament | Multi-filament | Mono-filament | Multi-filament | Mono-filament | Multi-filament |
| Black drum | 490 ± 7 (84) | 512 ± 12 (69) | 521 ± 10 (79) | 496 ± 8 (71) | 632 ± 20 (28) | 601 ± 14 (56) |
| Sheepshead | 366 ± 7 (28) | 366 ± 7 (36) | 391 ± 8 (30) | 391 ± 5 (53) | 443 ± 10 (13) | 417 ± 9 (38) |
| Southern flounder | 430 (1) | 407 ± 15 (16) | 457 ± 18 (3) | 440 ± 20 (11) | 481 ± 10 (8) | 508 ± 35 (10) |
| Spotted seatrout | 365 (1) | 685 ± 14 (4) | 462 ± 32 (8) | 371 ± 20 (4) | 488 ± 30 (8) | 390 ± 22 (6) |
| Red drum | 683 ± 13 (9) | 599 ± 15 (4) | 532 ± 38 (6) | 536 ± 26 (6) | 524 ± 9 (10) | 660 ± 68 (3) |

Table 5. Percent of catch and number (in parenthesis) in gill nets by webbing type and mesh size of five economically important finfish.

| Species | Mesh size (cm) | Webbing type | |
|---|---|---|---|
| | | Monofilament | Multifilament |
| Black drum | 15.2 | 51.4 (124) | 48.6 (117) |
| | 16.5 | 50.8 (91) | 49.2 (88) |
| | 17.8 | 34.5 (30) | 65.5 (57) |
| | Combined | 48.3 (245) | 51.7 (262) |
| Sheepshead | 15.2 | 38.0 (30) | 62.0 (49) |
| | 16.5 | 31.3 (31) | 68.7 (68) |
| | 17.8 | 26.5 (13) | 73.5 (36) |
| | Combined | 32.6 (74) | 67.4 (153) |
| Southern flounder | 15.2 | 6.8 (1) | 93.3 (14) |
| | 16.5 | 25.0 (5) | 75.0 (15) |
| | 17.8 | 36.4 (8) | 63.6 (14) |
| | Combined | 24.6 (14) | 75.4 (43) |
| Spotted seatrout | 15.2 | 40.0 (4) | 60.0 (6) |
| | 16.5 | 71.4 (10) | 28.6 (4) |
| | 17.8 | 56.2 (9) | 43.8 (7) |
| | Combined | 57.5 (23) | 42.5 (17) |
| Red drum | 15.2 | 64.3 (9) | 35.7 (5) |
| | 16.5 | 50.0 (7) | 50.0 (7) |
| | 17.8 | 76.9 (10) | 23.1 (3) |
| | Combined | 63.4 (26) | 36.6 (15) |
| All species combined | 15.2 | 44.2 (242) | 55.8 (305) |
| | 16.5 | 43.2 (221) | 56.8 (291) |
| | 17.8 | 40.9 (156) | 59.1 (225) |
| | Combined | 43.0 (619) | 57.0 (821) |

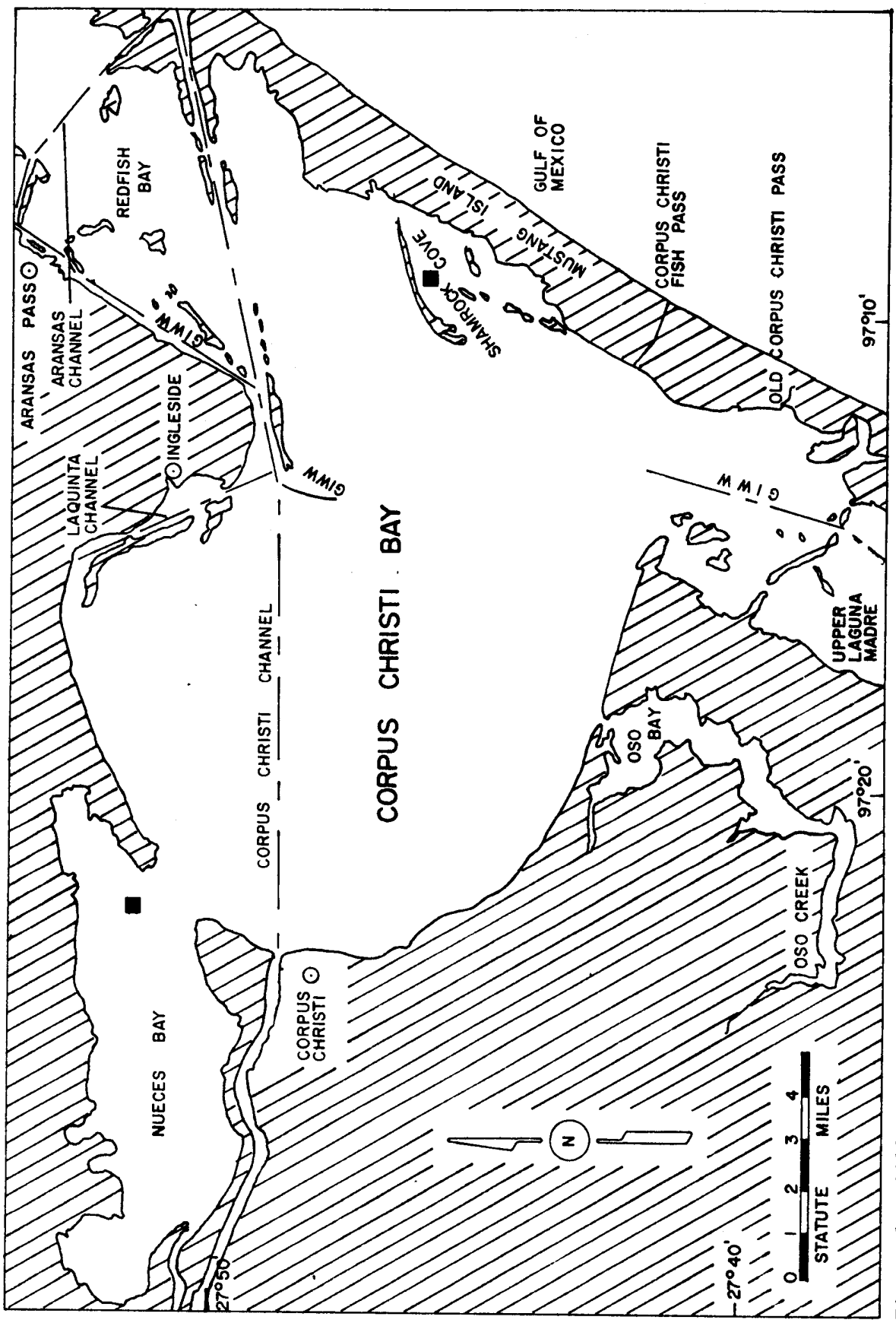


Figure 1. Gill net sample locations in Corpus Christi Bay, September-December 1981.

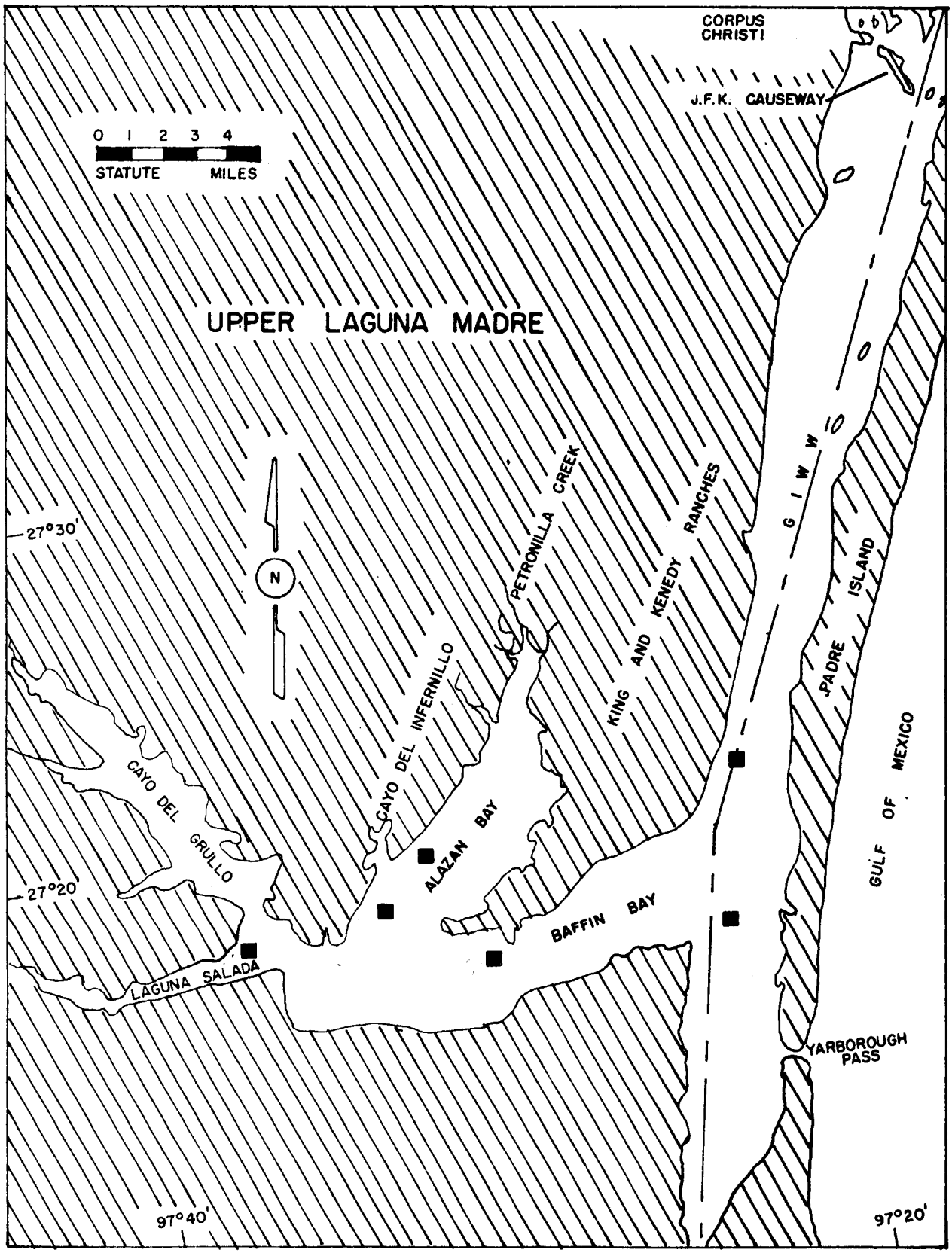


Figure 2. Gill net sample locations in the upper Laguna Madre, September-December 1981.

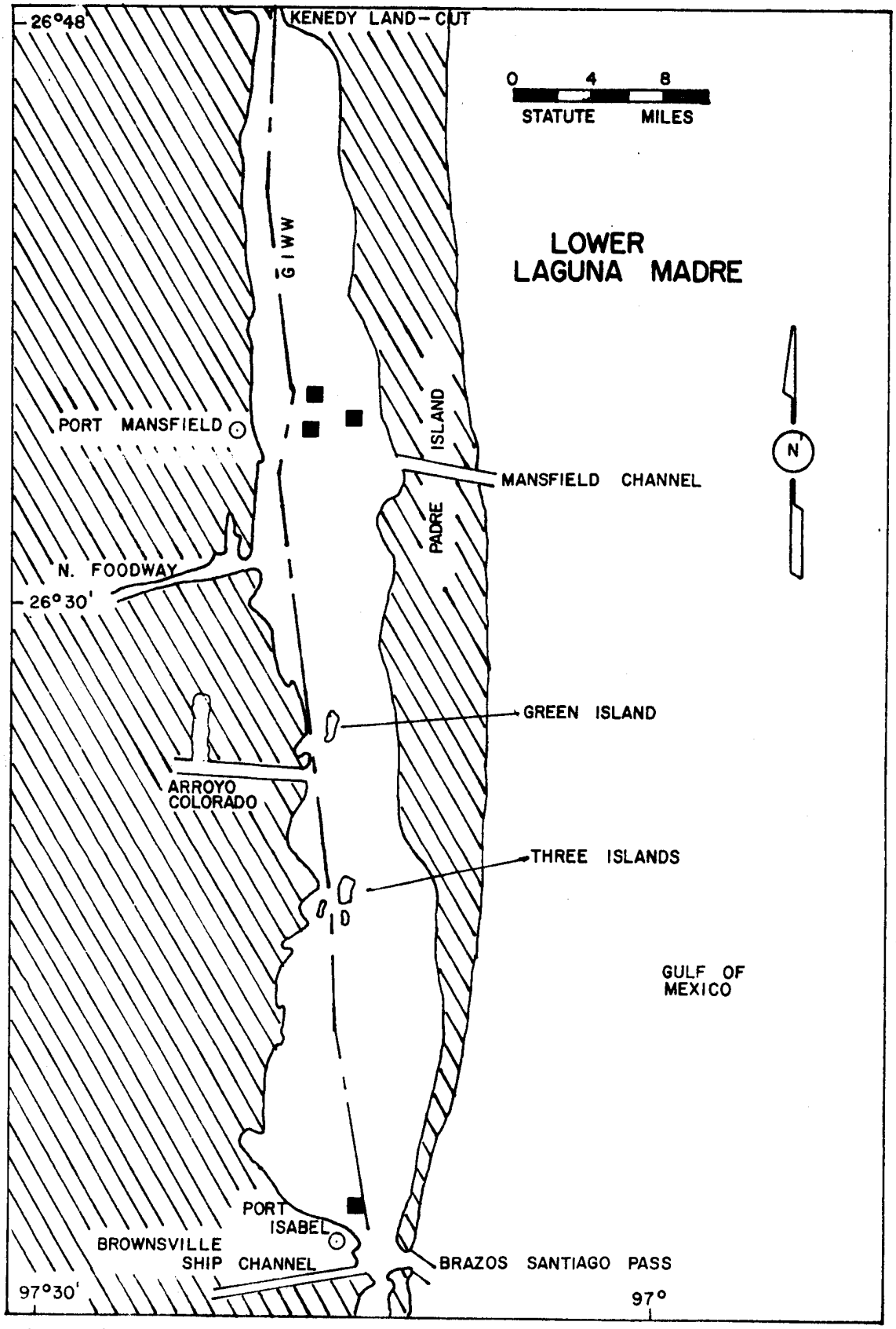


Figure 3. Gill net sample locations in the lower Laguna Madre September-December 1981.

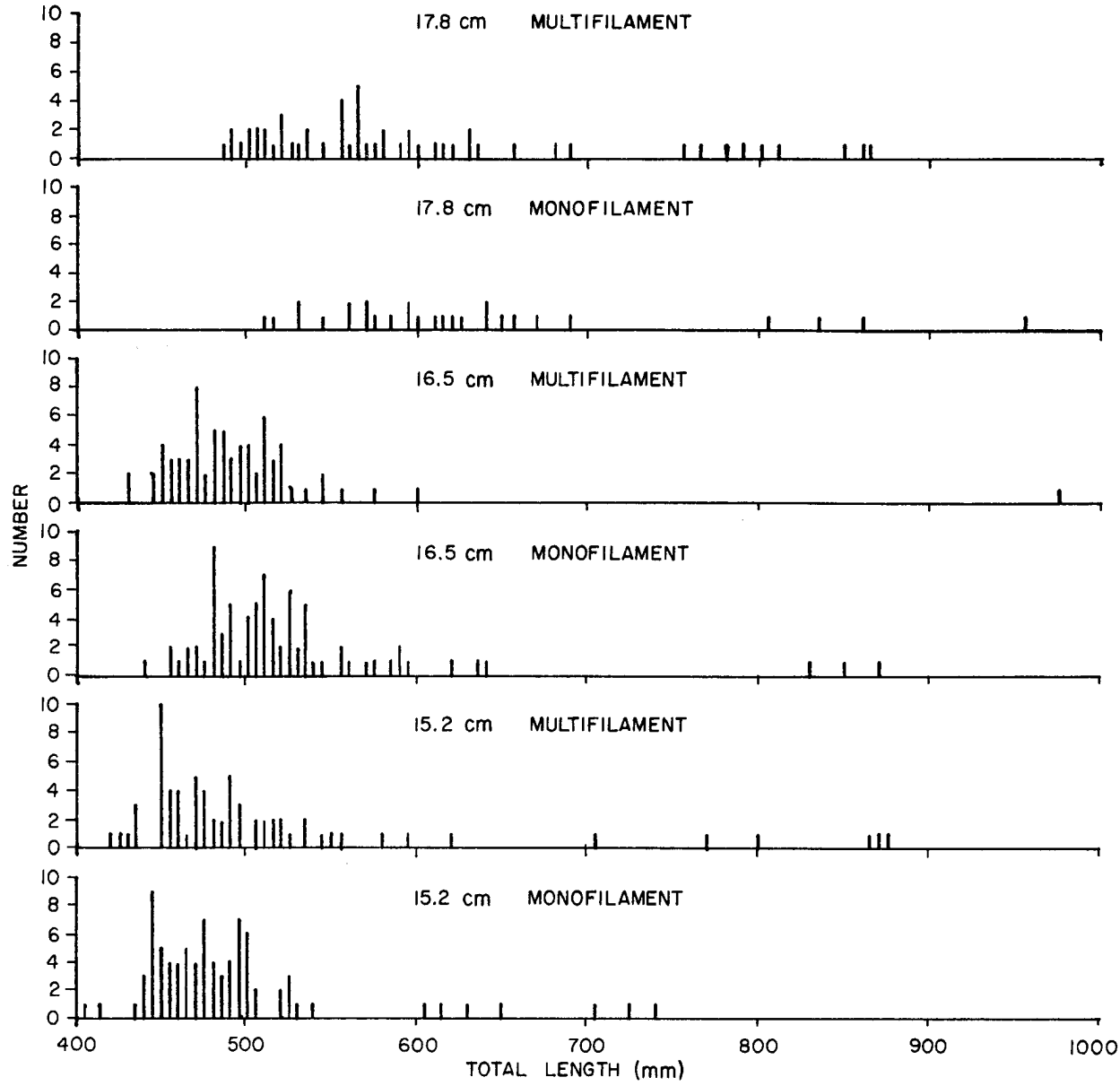


Figure 4. Length frequency of black drum caught in each mesh size and twine type.

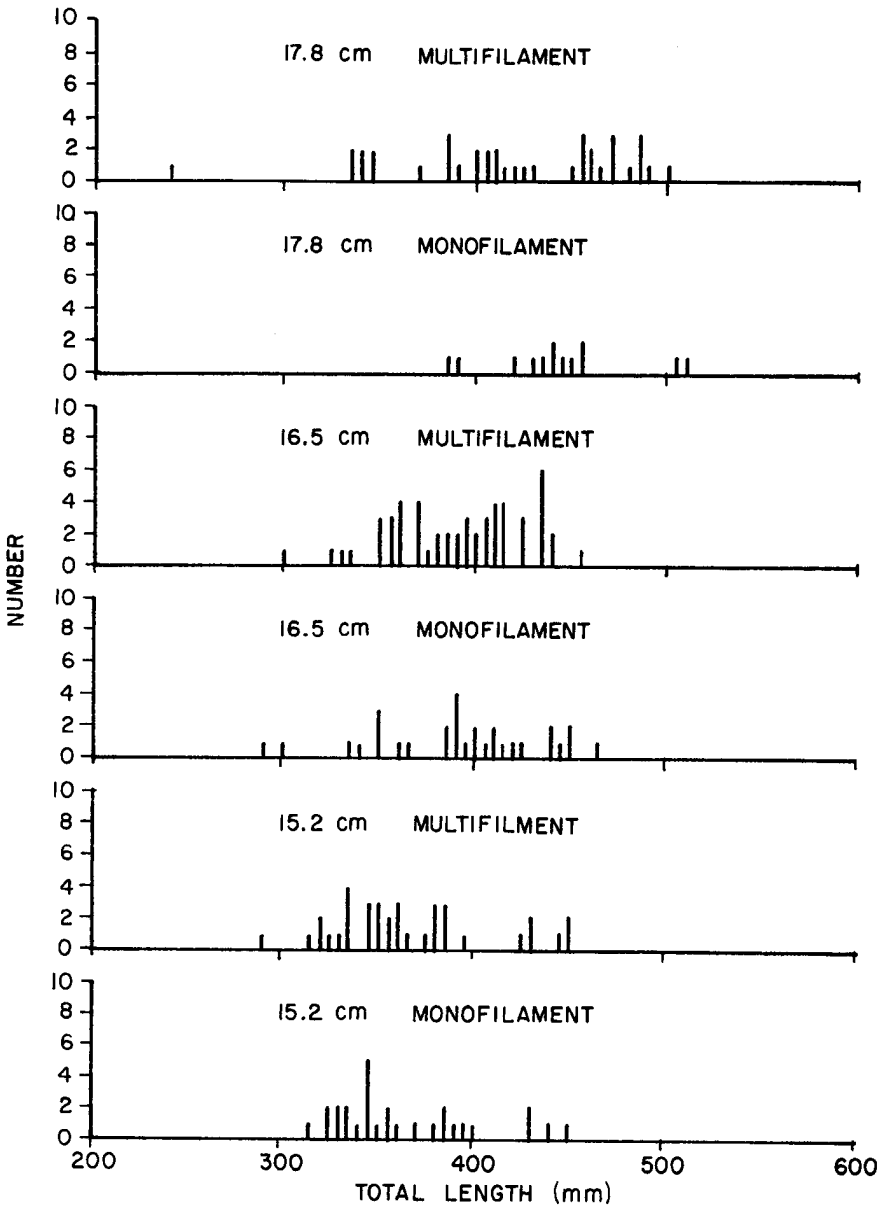


Figure 5. Length frequency of sheepshead caught in each mesh size and twine type.

# Appendix A: Hydrologic and Meteorologic Data

Table 1. Hydrologic and meteorologic data accompanying gill net sets in Corpus Christi Bay and Laguna Madre. Explanation of abbreviations and codes in Appendix A, Table 2.

| Date | Time | W.S. (mph) | W.D. | Tide | C.C. (%) | Precip. | Fog | S.C. | Depth Range (m) | Turb. (JTU) | Temp. (C) Air | Temp. (C) Water | Sal. (ppt) | D.O. (ppm) | B.P. (in. Hg) | B.T. | Veg. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 09-02-81 | I | 23 | 4 | 3 | 2 | 3 | 2 | 3 | 1.1-1.3 | 98 | 30.5 | 30.5 | 34.0 | 9.0 | 29.76 | 5 | 2 |
| | F | 12 | 4 | 2 | 4 | 3 | 2 | 3 | 1.1-1.3 | 77 | 27.0 | 28.0 | 34.0 | 6.0 | 29.95 | 5 | 2 |
| 09-09-91 | I | 12 | 2 | 3 | 2 | 3 | 2 | 2 | 0.6-0.8 | 24 | 29.5 | 30.5 | 32.0 | 10.0 | 29.97 | 5 | 3 |
| | F | 3 | 4 | 2 | 3 | 3 | 2 | 1 | 0.6-0.8 | 24 | 25.0 | 27.5 | 28.0 | 4.0 | 30.05 | 5 | 3 |
| 09-30-81 | I | 12 | 4 | 1 | 3 | 3 | 2 | 2 | 1.6-1.7 | 24 | 28.0 | 28.0 | 31.1 | 8.0 | 29.89 | 5 | 1 |
| | F | 4 | 4 | 1 | 3 | 3 | 2 | 1 | 1.6-1.7 | 24 | 27.0 | 27.0 | 30.5 | 8.0 | 29.97 | 5 | 1 |
| 10-15-81 | I | 20 | 4 | 1 | 2 | 3 | 2 | 2 | 1.8-1.9 | 47 | 29.0 | 29.0 | 31.6 | 9.0 | 29.88 | 5 | 1 |
| | F | 20 | 4 | 1 | 2 | 3 | 2 | 2 | 1.8-1.9 | 33 | 28.0 | 28.5 | 31.6 | 6.0 | 29.88 | 5 | 1 |
| 10-27-81 | I | 8 | 3 | 3 | 1 | 3 | 2 | 1 | 2.5-2.6 | 35 | 19.0 | 19.0 | 27.0 | 8.0 | 30.05 | 2 | 1 |
| | F | 4 | 2 | 1 | 1 | 3 | 2 | 1 | 2.5-2.6 | 40 | 17.0 | 18.0 | 27.0 | 8.0 | 30.04 | 2 | 1 |
| 10-28-81 | I | 8 | 2 | 2 | 4 | 2 | 2 | 2 | 2.1-2.4 | 80 | 22.0 | 22.0 | 12.0 | 8.0 | 30.00 | 1 | 1 |
| | F | 0 | - | 1 | 1 | 3 | 2 | 1 | 2.1-2.4 | 70 | 17.0 | 18.0 | 13.5 | 8.0 | 29.97 | 1 | 1 |
| 11-02-81 | I | 5 | 8 | 1 | - | 3 | 2 | 1 | 1.4-1.7 | 110 | 25.0 | 22.5 | 8.0 | 7.0 | 30.09 | 5 | 1 |
| | F | 8 | 7 | 3 | - | 3 | 2 | 1 | 1.4-1.7 | 28 | 19.0 | 19.0 | 6.0 | 7.0 | 30.12 | 5 | 1 |
| 11-16-81 | I | 2 | 1 | 1 | 3 | 3 | 2 | 1 | 2.1-2.5 | 26 | 25.0 | 25.0 | 28.0 | 6.0 | 29.97 | 5 | 1 |
| | F | 4 | 5 | 1 | 6 | 3 | 1 | 1 | 2.1-2.5 | 24 | 22.0 | 22.0 | 28.0 | 8.0 | 30.00 | 5 | 1 |
| 11-17-81 | I | 18 | 4 | 3 | 1 | 3 | 2 | 3 | 2.1-2.3 | 24 | 24.0 | 20.0 | 32.0 | 8.0 | 29.97 | 2 | 1 |
| | F | 18 | 4 | 1 | 4 | 2 | 2 | 3 | 2.1-2.3 | 24 | 20.0 | 19.5 | 32.0 | 8.0 | 29.98 | 2 | 1 |
| 12-02-81 | I | 14 | 4 | 3 | 1 | 3 | 2 | 2 | 1.9-2.4 | 24 | 21.0 | 20.0 | 24.0 | 6.0 | 30.40 | 5 | 1 |
| | F | 17 | 6 | 2 | 2 | 3 | 2 | 2 | 1.9-2.4 | 25 | 20.0 | 20.0 | 24.0 | 8.0 | 30.10 | 5 | 1 |
| 12-16-81 | I | 18 | 4 | 3 | 1 | 3 | 2 | 2 | 2.2-2.2 | 35 | 20.5 | 17.0 | 16.7 | 9.0 | 30.05 | 1 | 1 |
| | F | 12 | 1 | 2 | 6 | 3 | 1 | 2 | 2.2-2.2 | 36 | 14.0 | 16.0 | 16.7 | 8.0 | 30.11 | 1 | 1 |
| 12-21-81 | I | 22 | 5 | 3 | 1 | 3 | 2 | 3 | 1.2-2.2 | 97 | 24.5 | 18.0 | 16.1 | 8.0 | 30.21 | 1 | 1 |
| | F | 28 | 5 | 3 | 2 | 3 | 2 | 3 | 1.2-2.2 | 151 | 22.0 | 18.0 | 17.2 | 8.0 | 30.10 | 1 | 1 |

Table 2. Explanation of hydrologic and meteorologic abbreviations and codes.

| Code | Explanation |
|---|---|
| Time | I = Initial or time of set; F = Final or time of pickup |
| W.S. | Wind speed: miles per hour (m.p.h.) |
| W.D. | Wind direction: 1 = North (N); 2 = Northeast (NE); 3 = East (E); 4 = Southeast (SE); 5 = South (S); 6 - Southwest (SW); 7 = West (W); 8 = Northwest (NW) |
| Tide | 1 - Slack; 2 = Ebb; 3 = Flood |
| C.C. | Cloud Cover: 1 = 0-9%; 2 = 10-25%; 3 = 26-50%; 4 = 51-75%; 5 = 76-90%; 6 = 91-100% |
| Precip. | Precipitation: 1 = Slight; 2 = Heavy; 3 = None |
| Fog | 1 = Fog present; 2 = None |
| S.C. | Sea Conditions: 1 = Calm; 2 = Choppy; 3 = Rough |
| Depth Range | Depth in meters (m) at each end of the net |
| Turb. | Turbidity in Jackson Turbidity Units (JTU) |
| Temp. | Temperatures: Air in $^{o}$C; Water in $^{o}$C taken at surface (0-15 cm) |
| Sal. | Salinity: parts per thousand (ppt) |
| D.O. | Dissolved Oxygen in parts per million (ppm) |
| B.P. | Barametric Pressure in inches of mercury (in. Hg) |
| B.T. | Bottom Type: 1 = mud; 2 = sand; 3 = shell; 4 = clay; 5 = combination |
| Veg. | Vegetation: 1 = none; 2 = sparse; 3 = moderate; 4 = dense |

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